UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
OREGON OPERATIONS OFFICE
811 S.W. 6th Avenue
Portland, Oregon 97204

July 25, 2003

Mr. Jim McKenna
Port of Portland & Co-Chairman, Lower Willamette Group
121 NW Everett
Portland, Oregon 07209

Mr. Robert Wyatt
Environmental Compliance Specialist
Northwest Natural & Co-Chairman, Lower Willamette Group
220 Northwest Second Avenue
Portland, Oregon 97209

Re: EPA Response and Comments on the Portland Harbor RI/FS Programmatic Work Plan, March 31, 2003

Dear Mr. McKenna and Mr. Wyatt:

This letter provides EPA's response and comments to the RI/FS Programmatic Work Plan (Work Plan). EPA appreciates the effort that the Respondents have taken to begin the Portland Harbor NPL Site RI/FS. We understand that such a broad-scoped investigation is a significant task. EPA is committed to making the RI/FS as efficient as possible, while ensuring that sufficient data and information is gathered so that a thorough risk assessment can be conducted and appropriate cleanup decisions can be made.

EPA's top priority is to keep the RI/FS process moving forward and to have the characterization work begin in earnest. While the Work Plan is significantly improved over the Round 1 Draft Work Plan, it needs to be modified in several areas to be approved. EPA does not want another extensive or time-consuming revision of the Work Plan. Given our priority and in order to achieve an acceptable plan quickly, a majority of the comments direct specific changes be made. In accordance with Section VII., 4.B.ii.f. of the AOC, Respondents shall amend and submit a revised Work Plan responsive to our comments and directions within thirty (30) days of receipt of these comments.

There are extensive comments related to a few key sections of the Work Plan, specifically the site characterization section and risk assessment appendices. Comments on the site characterization section of the Work Plan comments are also based on our preliminary review of the Round 2A Field Sampling Plan. We expect to provide specific comments on the Field Sampling Plan soon. We also recognize that some of the issues, including a number of issues related to the risk assessment, will require resolution through separate Technical

Memoranda. Along with the revised Work Plan that is due within thirty (30) days, we are directing the
Respondents to provide a schedule for resolution of the risk assessment issues through Technical Memoranda as indicated in our general comments.

There also is a need to clarify EPA's expectations for future deliverables and the management of this project. Although the revised Work Plan was submitted on the March 31 deadline, several key pieces were submitted later, including the proposed fish consumption levels submitted on May 9, 2003, the proposed benthic approach on May 28, 2003, and the groundwater summary report on June 12, 2003. In addition, the document "LWG Responses to EPA Comments of the 2002 Draft Round 1 Work Plan," was submitted on May 16, 2003. This significantly increased agency review time and agency resources required to review the Work Plan. Due to these late submissions, additional comments likely will be forwarded and/or additional Technical Memoranda will be needed. In the future, EPA expects that all components required to be contained in or addressed in a deliverable will be submitted on the deadline unless EPA has agreed to an extension of time and commitment to a date certain for submission.

A significant deficiency in the second draft RI/FS Work Plan is the lack of a schedule for completing the RI/FS. EPA expects that with the comments on the Work Plan attached and the field sampling comments, that the Respondents will have a complete understanding of what the RI/FS process will involve. Therefore, the Respondents must submit a proposed schedule for completion of the RI/FS, in compliance with the AOC and SOW, as part of its revisions to the field sampling plan.

EPA considered comments received from its federal, state and tribal partners in preparation of the attached comments. The individual partner comments will be provided in a separate transmittal. Please also note that the Community Advisory Group (CAG) expects to be providing comments to EPA in the next couple of weeks. EPA may provide some additional comments based on our review of the CAG's comments.

EPA is available to meet with the Respondents' technical team to discuss our comments. Please call Chip Humphrey at (503) 326-2678 or Tara Martich at (206) 553-0039 to arrange a meeting. All legal inquiries should be directed to Lori Cora at (206) 553-1115.

Sincerely,

Chip Humphrey
Tara Martich
Remedial Project Managers

Enclosures

cc: John Crellin, ATSDR

Helen Hillman, NOAA
Ted Buerger, US Fish and Wildlife Service
Preston Sleeger, Department of Interior
Jim Anderson, DEQ
Kurt Burkholder, Oregon DOJ
Rick Keppler, Oregon Department of Fish and Wildlife
David Stone, Oregon Public Health Branch
Rod Thompson, Confederated Tribes of Grand Ronde
Tom Downey, Confederated Tribes of Siletz
Audie Huber, Confederated Tribes of Umatilla
Brian Cunninghame, Confederated Tribes of Warm Springs
Rick Eichstaedt, Nez Perce Tribe
Paul Ward and Tom Zeilman, Confederated Tribes of Yakama Nation
Valerie Lee, Environment International
Betsy Striplin, Striplin Environmental Associates

EPA Comments on
Portland Harbor RI/FS Programmatic Work Plan
(Revised March 31, 2003)

GENERAL COMMENTS

EPA provided the Respondents with a significant amount of time to resubmit the second draft of the RI/FS Work Plan (Work Plan). With the additional time, EPA and it's partners agreed to participate in workgroup discussions on the major technical issues in order to facilitate redrafting the Work Plan so that it would be approvable. Upon our review of the second draft Work Plan it appears that the Work Plan does not adequately address many of our original comments to the first Work Plan, or the more detailed issues that were discussed in the workgroup sessions. Although certain components of the Work Plan were improved upon and, with a little editing, would be acceptable, it is apparent that there remain some significant differences between the Respondents and EPA on the scope, goals, expectations, and path forward for the RI/FS.

The following general comments highlight some of the most significant deficiencies in the Programmatic RI/FS Work Plan. As noted below, certain issues should be addressed by submittal and approval of specific Technical Memoranda outside of the RI/FS Work Plan.

1) The proposed scope of work is not sufficient to meet the RI objectives of defining the sources, nature, and extent of contamination in Portland Harbor.

The Work Plan states that the purpose of the RI is to investigate the nature and extent of chemical distribution in the in-water portion of the site (i.e., the nature and extent of contamination). Based on the presentation of available data and our preliminary review of the Round 2A Field Sampling Plan, it does not appear that the nature and extent of contamination will be adequately defined or contaminant fate and transport understood at the completion of the RI.

Critical information may be lacking following Round 2B to allow the FS to move forward in a meaningful way. For example, delineation of localized contamination or hot spots will not be completed; the vertical extent of contamination will not be defined (i.e., how can potential dredge volumes be estimated?); the potential for recontamination cannot be assessed without characterization and an understanding of the hydrodynamic system (i.e., what is the contaminant loading from outfalls, groundwater discharges, upstream sources?).

2) Respondents must gather adequate data on the source, nature and extent of contamination before screening (possibly eliminating) chemicals of interest.

Several comments describe EPA's concern about proposals to limit COIs and COPCs. Proposals as to when it may be appropriate to eliminate COIs or identify COIs that will not carried forward

as COPCs, or when modifications to the COPC lists would be appropriate shall be submitted as a **Technical Memorandum** and approved by EPA.

3) The Work Plan must specify how the extent of contiguous contamination up-river and down-river of the ISA and will be defined.

A critical objective presented in the Introduction is to "define the Site sufficiently to allow EPA to define site boundaries." The draft RI/FS Work Plan acknowledges that the AOC and SOW designated river miles 3.5 through 9.2 as an initial study area but that, due to the nature of an RI/FS, the area needing sampled and characterized may change. Now almost two years from entering into the AOC, DEQ has conducted more source control investigations and preliminary assessments of potential sources to the river. There are potential sources downstream at RM 2.5 (Oregon Steel) and upstream at RM 12 (Broadway Cab). The Work Plan needs to present the process and approach for delineating the upstream and downstream extent of contamination so that site boundaries can ultimately be defined.

4) The Respondents' conclusions regarding the need for Early Actions are unacceptable.

The Work Plan does not adequately address the need for Early Actions within the Portland Harbor Site. It is acknowledged that Early Actions would be conducted separate from the RI/FS process. Therefore, we are not requiring revisions to this section of the document and are directing Respondents to delete the Early Action section from the Programmatic RI/FS Work Plan. EPA continues to seek Respondents to identify sites where early risk reduction and elimination of significant sediment sources to the river should occur. As information is developed about the site and sources to it, EPA can also determine when and where Early Actions are necessary.

5) The Work Plan approach of a river-wide assessment does not consider area-specific issues such as groundwater inputs or ecological receptor home ranges.

The Work Plan proposes to study the site as a whole, i.e., on a large scale. This approach, however, does not consider facility-specific 'details' such as groundwater and contaminant flux from individual facilities. The Work Plan should consider river-wide and river- reach approaches. A river-reach approach should also be considered for ecological risk evaluations. The Work Plan also refers to assessing risk at the scale of the entire ISA. It should be noted that the scale of the ISA may be larger than the home range of a receptor of interest. Therefore, the scale should be defined in ecological terms, and not just the size of the site. "Risk drivers" may change for different areas of the river. The RI/FS should not only assess "harbor-wide risk drivers," but also needs to assess localized effects.

6) The proposed use of a food web model is not adequately explained.

The use of a food web model is mentioned several times in this document as a way to relate sediment chemistry to tissue concentrations. Detailed information needs to be provided that

outlines how a food web model is proposed to be used in Portland Harbor, and how it will be parameterized to be site specific. This information is needed as soon as possible, because data needed to support the model should be collected during field sampling. The details of the food web model proposal, including model parameterization, should be submitted in a **Technical Memorandum** and approved before the appropriate field sampling event.

7) Toxicity Reference Values (TRVs) need to be defined and approved.

The TRV selection process provides the basis for which exposure point concentrations will be compared with toxicity information in order to calculate risk. The Work Plan appendix describes the development of a preliminary risk assessment. However, the TRV selection process is not included (Attachment C6 gives only a general overview). Proposed TRVs should be submitted in a **Technical Memorandum** and approved before conducting the risk assessment.

8) The upper hydrogeologic formations are not impermeable barriers to flow.

Numerous statements give the impression that the upper hydrogeologic formations are very fine and that ground water or contaminant flow in those formations is very limited. The majority of the soil and groundwater contamination are in these upper formations and presently discharging to the river. In addition, within any of those less permeable formations there are much more permeable interbedded lenses which are able to transmit the contaminants at a much higher rate. This issue was discussed in detail with the Respondents' hydrogeologists, and changes were strongly suggested prior to this version of the document.

9) Receptor Home Ranges and Exposure Units need to be defined.

For each receptor included in the ecological risk assessment (ERA), home range and exposure units need to be clearly defined. The Work Plan should outline this information, so that this information can be reviewed in conjunction with the FSP. Without this information, it is impossible to evaluate whether the FSP will meet the objectives of the assessment endpoints outlined in this document. Maps should be provided that clearly outline the habitat and receptor home range.

In addition, all receptor-specific parameters that will be used to derive a risk assessment should be discussed with EPA and submitted in a **Technical Memorandum** for review and approval prior to completing the Baseline Ecological Risk Assessment (BERA).

The draft RI/FS Work Plan contains the Respondents' restatements and/or interpretations of official documents, such as the AOC, SOW, EPA guidance, and/or laws and regulations. In general, EPA has not commented on the relevancy or accuracy of the Respondents' restatements and/or interpretations due to the programmatic nature of this document. The absence of a comment on any restatement or interpretation should not be taken as EPA's acceptance, agreement, or approval of any restatement or interpretation of any official document or law and regulation.

The enclosed comments more specifically illustrate the deficiencies in this second draft RI/FS Work Plan.

SPECIFIC COMMENTS

Section 1 - Introduction, Scope and Purpose

Section 1.0, page 1. The second paragraph states a "purpose of the RI/FS" which is not consistent with the purpose statement contained on page 4 of the SOW. The SOW is correctly quoted on page 6 (Section 1.3) of the draft RI/FS Work Plan. Please change Page 1 to be consistent with the SOW.

Section 1.0, page 1. Revise the third paragraph, as well as any other reference to RM 3.5 to RM 9.2 as the ISA, should be revised to reflect General Comment No. 6 above, and that the RI/FS will not be constrained to within those river miles.

Sections 1.1 and 1.2, pages 2-6. Subsections 1.1 and 1.2 are not necessary for the Work Plan. In particular, these sections focus on the first half of the last century and don't discuss more recent pollution sources. Likewise, sources of pollution are discussed other places in the Work Plan. The most cost-effective approach to revisions is simply to delete these sections as they are unnecessary to the creation of the Work Plan. However, if Respondents would prefer to include this information, it should include a thorough discussion of sources of pollution since 1980 and relevant data collected since the late 1990s. In addition, Respondents should add Manufactured Gas Plant Sites to the types of historic industry.

Section 1.3, Page 7 – Amphibians should be included in the bulleted item list.

Section 1.3.1, page 8, RI/FS Technical Approach - The Work Plan states it is based on EPA guidance documents and "Principals for Managing Contaminated Sediment Risks at Hazardous Waste Sites." While in general this may be true, the Work Plan does not consider the first principle of controlling sources early (i.e., identify and prioritize sources according to their relative risk). The most readily apparent sites are largely ignored by the Work Plan and are not considered candidate sites for Early Action. Revise this section to indicate that assessing the appropriateness of source removal and early risk reduction actions will be one objective for site characterization work, field sampling, and data review and analysis.

Section 1.3.2, page 9, Subtasks - The referenced text describes the steps in the RI/FS process. In the 1st Step, the Work Plan includes Subtask 2a and 2b. Subtask 2a appears to be correctly included, but Subtask 2b ("Cultural Resources Analysis") is not described in the referenced text, nor does it appear to belong in the 1st Step.

Section 1.3.2, page 11, Item 5: In accordance with the General Comments above, Item 5 should be deleted as the criteria and Early Action evaluation will be deleted from the Work Plan.

Section 1.3.2, page 12, Item 7: Baseline Risk Assessments - Additional rounds of sampling will be needed after Round 2 in order to complete the Baseline Risk Assessment. The Round 2 sampling, as proposed, will not be sufficient. This section should be revised to reflect that final risk assessment methodologies and procedures are not contained in the Work Plan, and that additional discussion and technical memoranda will be prepared for approval by EPA.

Section 1.3.2, page 12. Number 8, Feasibility Study. The draft RI/FS states that during the RI, several FS tasks will be conducted, one of which is determination of SMAs and refinement of areas and volumes of sediment requiring remediation. EPA agrees that sampling and analysis to determine nature and extent of contamination requiring remediation is a fundamental RI task. EPA at this time cannot agree that determining sediment management areas as that terms is used in the draft RI/FS is appropriate to do during the course of the RI as it may inappropriately bias RI sampling. That bulleted item must be revised as follows:

$ Refinement of areas and volumes of sediment requiring remediation.

Section 1.3.3, Pages 13-15 - The text mentions that the RI/FS has steps that will be repeated up to four times before the FS is completed. As discussed elsewhere, there is still a possibility that additional sampling rounds will be needed. The text needs to state that these steps are sequential. As the RI process is iterative, data from each sampling event must be validated and analyzed in a timely way so that results are available to direct and inform future rounds of sampling. For example, Round 2 results and data gaps should be approved prior to the development of the Round 3 field sampling plan. This sequencing needs to occur to minimize the need for additional rounds of sampling and to help guide the sampling.

Section 1.4, page 15, Cultural Resources - The discussion should, at a minimum, present the anticipated scope of work required under the AOC, and a set schedule for completing the work.

Section 1.5, page 15, Community Relations - This section should reflect what is required by the AOC.

Section 2 - Physical Setting

Section 2.0, page 18, Relative Datums - This section would benefit by presenting a discussion of the relative datums used in the Portland Harbor basin (e.g., Columbia River Datum, City of Portland, National Vertical Geodetic Datum (NGVD; usually 1929 or 1947), North American Vertical Datum of 1988 (NAVD88); and mean sea level (MSL)).

Section 2.1.1, page 18, Geologic Map - Add a geologic map of the area.

Section 2.1, Pages 19-27, Hydrogeology - This section should state that it is preliminary information, but that more information will be learned throughout the RI/FS about the

hydrogeology of the site. Because of the late submittal of the historic groundwater evaluation, the agencies have insufficient information to agree with information presented. Only with an adequate historic groundwater evaluation can the governments provide comments on the validity of key assertions made in this section.

Section 2.1.2, Page 21, Hydrogeologic Units - "Fill and Fine-grained Facies of Flood Deposits and Recent Alluvium (FGF)", this type of unit name is not appropriate and should be renamed. The label is biased and emphasizes the low conductivity characteristics of some of the formation while ignoring the higher conductivities of the interbedded sands. If the name is a formally recognized name for the unit, then it will need to be referenced, and a disclaimer given to indicate that it is only a name and not a fully descriptive label for the hydrogeologic work proposed for the Portland Harbor project.

Section 2.1.2, Page 22. Hydrogeologic Units - "Coarse-grained Flood Deposits and upper Troutdale Formation (CGF)". Please delete the noted text. The CGF unit ..... The hydraulic conductivity of this unit measured in the vicinity of the Doane Lake area ranges from 3 feet per day to greater than 40 feet per day (AMEC 2001). ~~Consequently, this unit should be considered to potentially exert a greater influence on deeper groundwater flow to the river at this location and other similar settings along the ISA, including the southern edge of the ISA and on the east side of the river in the vicinity of the International Terminal.~~ We suggest <u>adding</u> the following "this unit may act as a drain and allow ground water and contaminant plumes to move to greater depths, and require a modified characterization approach."

Section 2.1.3, Page 23, Groundwater Flow - Delete "distinct" from the sentence "Up to three distinct general groundwater flow systems of interest are recognized along the ISA." It is not clear that these formations are separated or have clear boundaries.

Section 2.1.3, Groundwater Flow - The Work Plan acknowledges that the "Willamette River is the focus of discharge for the three flow systems of interest to the RI/FS. The hydrogeology of the ISA is based generally on an assemblage of data collected for individual upland sites. Recent and historical contaminant hydrogeology data for these individual sites are well established and have been accessible to the Respondents, yet they are not addressed here. The physical and chemical aspects of contaminant migration to the LWR should be characterized in this section, without regard to a risk-based criterion. Therefore, the contaminant hydrogeology of each of the upland sites should be summarized and presented in an overview of the hydraulic and contaminant connection between the LWR and groundwater along in the ISA.

Section 2.1.3, Page 24, Shallow Flow System - "A shallow, unconfined, groundwater flow system along the margins of the ISA consists mostly of fill and fine-grained alluvial deposits of the shallow FGF." Add to this sentence "with some medium and coarse grained sand."

Section 2.1.4, Page 26, Processes Governing Discharge of Groundwater to the ISA - We cannot agree with the following statement and suggest removal of the noted text. "Generally, groundwater flow adjacent to the ISA is toward the river.....~~The predominance of fine-grained materials adjacent to the river that comprise the shallow groundwater system suggests that the relative contribution to the total groundwater flux to the ISA from the shallow system is very low.~~"

Section 2.1.4, Page 26, Processes Governing Discharge of Groundwater to the ISA - The following sentence should be changed as follows: "Discharge from the shallow water-table groundwater system will tend to be focused at or below the river/shore interface. Low river stages expose <u>zones of focused discharge as</u> seeps along the bank where the shallow groundwater surface intersects the ground surface."

Section 2.1.4, Page 26, Processes Governing Discharge of Groundwater to the ISA- "Discharge from the intermediate and deep flow systems occurs well below the river surface." We do not agree with this unsupported statement since the flows are not distinct and isolated (see comments above). Please remove it.

Section 2.1.5, Page 27, Groundwater/Surface Water Transition Zone - We do not agree or understand this comment. Suggest it be removed entirely. "~~In the intermediate flow system, periods of high river stages may result in periods of greater mixing than in the shallow system, which results in an increase in the overall percentage of surface water comprising the porewater within the bioactive zone.~~"

Section 2.1.5, Page 27, Groundwater/Surface Water Transition Zone - Same as previous comment. Remove. "~~The depth and rate of mixing within the Transition Zone may be greatest in the deeper sections of the river where deeper flow systems discharge. Tidal fluctuations, under conditions where the gradient between groundwater and surface water normally is small, become more significant and result in frequent but short-term changes in hydraulic gradients, which promote mixing of surface water and groundwater within the Transition Zone. In this case, the percentage of surface water comprising porewater within the bioactive zone may be greater than the upper flow systems in general.~~"

Section 2.2, page 27, Hydrology Definitions - Add definitions for the following: Willamette River Flood Stage; ordinary high water line; mean high water; and mean high river stage.

Section 2.5, Page 33 - The sediment concentration data collected in at least two locations should be sufficient to calculate a mass balance to show sediment transport through the river system. A mass balance should be calculated to provide another indication of sediment transport in the LWR.

Section 2.5, page 35 and Section 2.6.1, page 38 - The correct reference appears to be “SEA 2002b” not “SEA 2002a”.

Section 2.6.2, page 39, Riverbed Elevation Change - The Work Plan should discuss the period that is represented by the bathymetric change (i.e., low water, <1 year flood event). Can the flow data (river stage and discharge measurements) during this period be compared to historical records to determine if this period is representative of low flow conditions or a <1 year flood event?

Section 3 - Chemical Sources

Section 3.0, page 42-49, Chemical Sources - While this section identifies potential sources of contaminants to Portland Harbor, the individual source discussions are too general.

Section 3.1, page 42, Types of Chemicals that may have been Released - The referenced text lists types of chemicals that may have been (or are being) released from facilities in the ISA. Add other SVOCs (such as phthalates) and perchlorate to the types of chemicals that may have been released.

Section 3.3, page 43, Groundwater Discharge - The upland investigations have generated a considerable amount of groundwater data from monitoring wells and direct-push technology (DPT) borings. Most of the available data document groundwater gradients to the river and the presence of hazardous substances in groundwater. Therefore, it can be concluded that hazardous substances are being discharged to the river by groundwater through the river sediments. Revise this section to identify known contaminated groundwater plumes discharging to the river, the contaminants of potential concern, and a figure showing their location. The following sites have known contaminated seeps discharging to the river: Schnitzer Steel, GATX/Kinder Morgan. Linnton Oil Fire Training Grounds, Terminal 4, Mobil Oil (slurry wall breach), Atofina, Rhone-Poulenc, McCormick and Baxter, GASCO, and UPRR/Albina. Groundwater contamination that is likely to be entering the river via deeper sediments has also been documented at the Gunderson and Wacker sites and should be discussed in this section.

Section 3.4, page 46 - Include information from spill records earlier than 1995 as it could help identify potential areas for sediment sampling or possible sediment contamination. It would be reasonable to investigate major spills from at least the 1940's when significant expansion of industrial activity occurred and the use and manufacture of many hazardous chemicals increased.

Section 3.5, page 47 - Include sites that have or may have contaminated bank soils that could be eroded into the river (e.g., McCormick and Baxter, Gasco, Atofina, Crawford Street).

Section 3.5, page 47 - Include potential leaching from treated pilings or bulkheads in this section. Identify sites that have or may have been contaminated from chemical leaching.

Section 3.8.1, page 48 - Include industrial and commercial activities upstream of the ISA (for example, the MGP site near the Steel Bridge at RM 12).

Section 4 - Summary of Previous Investigations

Section 4.1.1, Pages 51-52 - Provide the specific reason (of the four factors) why a datum or a set of data were placed into Category 2 (see comment for Appendix G). This was done for the bioassay data in Table 4-8, and should also be done for Table 4-1. Without the specific reason(s) and backup information, a thorough evaluation of whether data were appropriately categorized cannot be completed.

Section 4.1.2, page 53 - The text here says that in assessing the historic bioassay data, "data comparability among benthic data sets was used as an additional QA/QC criterion." This should be described in much more detail, especially if this "data comparability" criterion" was used to eliminate any data.

Section 4.1.2, Page 54, Bioassays and Table 4-8 - According to the text there are two surveys that were assigned to Category 2. The table shows several more surveys or portions of surveys. Text should be modified to be consistent with the table.

Section 4.2, Pages 55-60 - Indicate in the text which of these studies are Category 1, and which are Category 2. It appears some Category 1 data may be information gathered prior to dredging. How are these results still valid?

Section 4.2.2, page 57 - This section states that the historical sediment "…concentrations may or may not be representative of current conditions or representative of sources that originated in the ISA…." At what point will it be determined if the data are or are not representative and how will this decision be made?

Section 4.2.2, Page 57 - According to page 54, this section is supposed to discuss the studies after 1990 (Section 4.2.1 discussed pre-1990 studies)but the information is not here. Why do the studies from the 1970s and 1980s merit more detail than studies in the 1990s? The contaminant summaries are not sufficient to present the studies that occurred from 1990 to the present. Revise the text and add information about the 1990's studies and explain which studies are Category 1 and which are Category 2.

Section 4.2.2 and Figures 4-1 through 4-34, Pages 57-60 - The contaminant concentration ranges shown on the figures should be discussed in the text.

Figures 4-1 through 4-34 - The lower end of the scale on the figures should not be in the thousands range. Lower the concentration range for high- and low-molecular weight polycyclic aromatic hydrocarbons (PAHs).

Figures 4-1 through 4-34 - For certain contaminants, the upper concentration for the smallest symbol should be lower in value, such as:

- $ for arsenic, the upper concentration should be 5 ug/kg or less
- $ for cadmium, the upper concentration should be 0.5 ug/kg or less
- $ for tributyltin ion in porewater, the upper concentration should be 0.05 micrograms per liter (ug/L) or less
- $ for bis(2-ethylhexyl)phthalate, the upper concentration should be 745 ug/kg or less
- $ for dibenzofuran – the upper concentration should be 100 ug/kg or less
- $ for pp-DDT, -DDD, and -DDE – the upper concentration should be 5 ug/kg or less
- $ for polychlorinated biphenyls (PCBs), the upper concentration should be 34 ug/kg or less

Figures 4-14 and 4-31 - Explain the data sets and provide supplemental information for xylenes and why the higher concentrations are all Category 2 data. In addition, the data concentration ranges do not match for the surface and subsurface sediments. Please explain and rectify.

Figures 4-16 and 4-33 - Explain the data sets for 2,3,7,8-tetrachlorodibenzo-p-dioxin and provide supplemental information why the higher concentrations are all Category 2 data.

Section 4.2.2 and Figures 4-1 through 4-34, Pages 57-60 - Discuss the rationale for excluding other contaminants from presentation, such as petroleum hydrocarbons and chlorinated organic compounds such as 1,1,1-trichloroethane.

Section 4.2.2, page 60 - This section states that between RM 3 and 4 “average subsurface copper, lead, mercury, zinc, HPAH, LPAH, DDTs, and dibenzofuran concentrations are higher than corresponding average surface concentrations.” This area is shown by the Sediment Transport Analyses summarized on Figure 2-13 as a “mixed case” or “Dynamic Equilibrium.” The bathymetric change map (Figure 2-15c) shows this area as primarily an area of deepening or erosion. This indicates that sediment cores are crucial in understanding the vertical extent of contamination, potential future risks, and in verifying the hydrodynamic model.

Figure 4-35, Page 60 - Discuss the meaning of white (unshaded), gray (lightly shaded) and black (shaded) on the figure.

Section 4.3.2, Page 62 - “Although there are data for other stations, they were sampled only on a single occasion or were representative of source characteristics rather than water quality in the river.” This data should be presented; part of the remedial investigation is to identify sources. (In addition, units in the column headings in Table 4-7a should be removed as they are incorrect for conventional parameters, and the stations should be explained in a footnote).

Figure 4-37 - The legend needs to indicate which sample locations are USGS sampling locations.

Section 4.3.2, Page 62 - Which conventional water quality measurements are not presented in Table 4-7a?

Section 4.3.2, page 63 - Additional surface water data collected by Oregon State University using semipermeable membrane devices (SPMDs) are available for the Portland Harbor ISA. While the data have not have been published, data from the McCormick and Baxter site are available and have been provided to the Respondents. Present this information in the RI Work Plan.

Section 4.5, Page 70 - Remove the word "occasionally" from the text: "[o]ther sources (CRITFC 1994) suggest that Native Americans fish occasionally in the Willamette River."

Section 4.5, page 70 - The text states that "Surveys conducted on the Willamette River suggest that the groups most likely to be catching and eating fish from the LWR are immigrants from Eastern Europe and Asia, African-Americans, and Hispanics." The reference provided for this statement is ATSDR 2002. John Crellin of ATSDR did not conduct a formal survey of fishing practices on the LWR; rather, he interviewed a few local anglers and asked their opinions about fishing practices. The word "surveys" should be replaced with "interviews."

Section 4.5, page 70 - The first sentence of the 2nd paragraph on page 70 says " Commercial fishing in the area is not extensive and is limited to Pacific lamprey and crayfish fisheries." The next sentence is "The exact extent to which commercial fishing occurs in the ISA is unknown". These 2 sentences are not consistent. The first sentence should be removed since there is little data to support it. Also in this section, change the word "recreational" to "non-commercial" so it can apply to both the recreational fisher and non-recreational fisher scenarios.

Figures 4-40 and 4-41, Page 71 - "Inspection of the graphs shows that the pre-1997 and post-1997 data sets are generally similar." Presentation of the data sets in this manner is of little use as the mean of a contaminant concentration in each river mile is compared. There are several parameters that vary greatly, including the amount of erosional and depositional areas in each river mile, where the samples that were averaged together were taken, more samples taken in a depositional area pre-1997 than post-1997, etc. This comparison is not sufficient to show that pre-1997 data are representative of current conditions and therefore are usable for the remedial investigation. In addition, the representativeness of the data should be reevaluated following completion of the hydrodynamic model and selected resampling of sediments in selected areas to validate the conceptual site model.

Section 5 - Preliminary Conceptual Site Model

Section 5.0, page 73 - We agree that the CSM is dynamic and will need to be updated and refined as additional data are collected.

Section 5.1, Page 73 - We disagree with a number of the concepts presented in this section. The following comments and required edits are an indication of the issues that need correction:

> "Chemicals may be present in soil as solids, dissolved constituents, or non-aqueous phase liquids (NAPLs), including light non-aqueous phase liquids (LNAPLs) and dense non-aqueous phase liquids (DNAPLs). Liquids released to soil may infiltrate and percolate through the soil column to groundwater as diagramed in Figure 5-2a.
> LNAPLs released to soil will migrate vertically downward to low-permeability zones or to the water table where unrestricted. Thus, the vertical distribution of LNAPLs in the unsaturated zone is controlled by the depth of the water table, as well as by the vertical permeability and sorptive capacity of the sediments. Lateral migration of a LNAPL is controlled by (1) the gradient of the groundwater surface, (2) the presence of permeable layers within the uppermost-saturated unit, (<u>should allow for existing sands</u>, this can be demonstrated during sampling for characterization, but it cannot be assumed apriori) (3) the volume and rate of the release, (4) the presence or absence of human-made or natural preferential pathways, and (5) the physical characteristics of the LNAPL. Many petroleum LNAPL constituents typically are not very mobile in low-permeability, .(Again, this is a biasing statement which should be based on data during sampling). At the groundwater surface, LNAPLs typically produce a dissolved plume for chemicals, such as aromatic volatile organic compounds (VOCs) (e.g., BETX) and other chemicals that may extend some distance downgradient from the LNAPL itself. (Add- <u>Some</u>) Dissolved organic plumes do, however, tend to naturally attenuate through biodegradation, adsorption to soil particles, and various geochemical processes, thus limiting their migration from the source."(Add--whereas chlorinated solvents and other recalcitrant organics may or may not.)
>
> "The vertical transport of DNAPLs is controlled by ..... of low-permeability layers. However, if the DNAPL release encounters discontinuities in low-permeability layers or coarse-grained alluvial sediments (<u>Add– as would be expected in a major fluvial system like the Willamette River)</u>, penetration to greater depths may occur, which could result in an ongoing dissolved plume source in the deeper flow systems discharging to the river. Experience..."

Section 5.1.3, Page 76 - The main problem with this section is the biased position taken that contaminants <u>may flow or may be transported</u> to the Willamette River. We suggest that transport is to be expected and that the objective of this work is to either document that transport is happening or show it is not transporting through as would be expected in a ground water discharge zone as the Lower Willamette River. Please make the following changes to this section: "Groundwater-related components of the RI/FS will focus on understanding the potential for contaminated groundwater to affect sediments and surface water in the Willamette River. Dissolved chemicals in groundwater <u>will most likely</u> be transported toward the river by groundwater flow. As described in Section 2.1.3, groundwater in the vicinity of the ISA

discharge via seeps above the water line or to porewater if discharged below the water line (Figure 5-2a; Section 2.1.4)."

Figure 5-2a - The DNAPL flow lines should not just go along the basalt /sediments interphase, but should pool and move laterally at multiple locations in its vertical path, especially wherever there is a major formation discontinuity or interbeds. Also, the physical movement arrows which are enclosed inside any one discontinuous lens need to extend beyond the edge of the lens since the flow rates may change, but the flow is not prevented from moving towards the river.

Section 5.0, page 78, CSM, Groundwater Discharge to River - This section states that the effect of groundwater discharge on water column chemistry is expected to be minimal. The recently collected surface water, groundwater, and pore water data collected by OSU at the McCormick and Baxter site clearly showed surface water quality is impacted by groundwater discharges. Therefore, it is not acceptable to eliminate evaluation of surface water impacts from contaminated groundwater discharges.

Section 5.0, page 78, CSM, Groundwater and Pore water - The referenced text suggests only halogenated volatile organic compounds (VOCs) and certain metals with a low affinity to partition to sediments may impact pore water or surface water quality. Pore water may contain other chemicals at concentrations greater than risk-based or screening levels. Therefore, pore water should be evaluated on a site-by-site basis for site specific contaminants of potential concern.

Section 5.0, page 79, CSM, Groundwater Mobilizing Contaminants in Sediment - This section states that impacted groundwater flowing through impacted sediment will mobilize chemicals from the sediments. Depending on the physical system, contaminants in groundwater may partition to the sediments and thus contribute to the sediment contamination or pass directly through the sediments and impact pore water or surface water. Halogenated VOCs and metals may partition to aquifer materials and sediments as they migrate from anaerobic zones to more oxygenated zones. The discussion regarding dissolved or aqueous phase should indicate the potential for some metals, pesticides, and polynuclear aromatic hydrocarbons (PAHs) to migrate through the river sediments and enter the Willamette River as dissolved constituents.

Section 5.1.3, Page 79, Transport Media and Mechanisms, Groundwater, Scenario #3 - Delete the statement "the potential for extensive effects from this scenario (impacted groundwater from an upland sources flows through impacted sediments) is considered low because it implies significant cosolvency effects". We disagree with the conclusion that there are low effects and Respondents has presented no data to substantiate the claim. In addition, it is not entirely clear what "cosolvency effects" are.

Section 5.1.3, Page 80, Transport Media and Mechanisms, Groundwater, Scenario #4 - The statement "...any sediment source of significant strength has been present for at least several

decades..." is not substantiated and should be deleted. Data available from DEQ indicate that there are more recent sediment sources that exist and they are being addressed by the Respondents.

Section 5.2.1, Page 81, Benthic Invertebrates - Invertebrates should be addressed as a population.

Section 5.2.2, Page 83 - Describe the methodology if a pathway is of "undetermined significance" and the uncertainty is not resulting from "a lack of sufficient toxicological data." For example, it appears that the benthic invertebrate community and porewater (described on page 84) has "undetermined significance" and more information will be gathered and evaluated. Also, for "complete and minor", it is stated that this pathway will not be quantitatively addressed unless sufficient data is available. How would the insufficient data for these pathways be addressed in data gaps analysis or future field sampling.

Section 5.3.2, page 87 - Willamette Riverkeeper have expressed a concern that divers (ship repair and public safety officials) be considered as a receptor that would also be protective of recreational uses because of more significant contact with surface water. Also, scenarios should consider of future receptors where additional development and increased community use would likely occur.

Secton 5.3.2, page 88 - It is stated that the baseline risk assessment will focus on exposures within the ISA. The risk assessment should also evaluate additional areas outside that ISA that are identified through the RI process.

Section 5.3.2, page 89 - Under "Current and Future Recreational Beach User" - Add "as compared with other recreational receptors" to the end of the second sentence. Under "Current and Future Fishers," revise the last sentence. Dermal contact with water while fishing may not be unintentional. Depending on the fishing method employed, dermal contact with water may be necessary.

Section 5.3.2, page 89, under "Current and Future Transients" - Remove the word "incidental." Transients have been observed and are likely using river water for drinking water and for cooking (also see comments on this issue in Appendix D comments). Also, fish consumption by this receptor should considered as a potential data gap.

Under "Current and Future Fishers," while the risk assessment will assume that the different fisher categories being assessed will be distinguishable based upon the amount of fish they eat, it's unlikely that such a clear distinction will be possible for the species being eaten.

Section 6 - Overview of Portland Harbor RI/FS Process

General Comments, Sufficiency of Data for a ROD

Section 6.0, Page 90 - We do not agree that the current sampling scheme, as proposed (four proposed rounds of data with the Category 1 data), is sufficient for obtaining a record of decision. The conclusion should be removed from the text.

A major disagreement that EPA and its partners have with the RI Work Plan is the limited data collection being proposed by the Respondents for specific sources. The necessary nature and extent data needed to define an SMA (including lateral and vertical extent of the contamination) should be collected in Round 2. Respondents' proposal to have this data collection effort come after the ROD is complete and to have it be collected by "individual property owners" is not acceptable. Complete nature and extent data is necessary to both identify SMAs (and define the remedial alternatives needed for these areas) as well as to eliminate areas/sources as SMAs.

Overview of Portland Harbor RI/FS Process - This section states that the objectives of the sampling, "generally include obtaining sufficient information to assess site-wide risk and understand the distribution of chemical constituents to support the development of the RI and baseline risk assessment reports." Although both the Work Plan and field sampling plan identify defining the nature and extent of contamination as an objective of Round 1 and Round 2 sampling events, the proposed sampling is not sufficient to achieve the stated objectives. Significantly more sampling is necessary to characterize known in-water source areas and to identify other potential sources. If the Respondents believe a source is adequately delineated (e.g., Gasco, Atofina, Oregon Steel Mills) the Work Plan should illustrate the estimated vertical and lateral extent of contamination on appropriate figures, provide the rationale for the delineation, and provide an estimate of the exposure point concentrations for that area that will be evaluated in the risk assessment.

In Section 6.2.2, page 94 - The Work Plan states "The site-specific extent of risk and specific remediation activities will be refined following the ROD as additional data are collected by individual property owners in the RD/RA phase of work." This approach is not acceptable. Evaluation of risk within the locality of facility must be determined prior to the ROD. With the approach proposed in the Work Plan, who is responsible for management and or remediation of the river-wide contamination or for contamination that is not attributable to an individual property owner? Remedial actions (i.e., the ROD) for the river should be selected in accordance in accordance with EPA and DEQ's remedial action selection factors. Respondents' concerns should be expressed in terms of the regulatory balancing factors.

Section 6.2.2, page 95 - The text here calls for a process to allow maintenance dredging to occur without being impeded by the ROD. This issue is already addressed in an EPA/Corps of Engineers agreement and does not need to be addressed in the Work Plan. If capping or natural attenuation is selected, institutional controls will be included in the ROD to ensure these remedies remain effective over time. EPA expects the Work Plan should consider potential negative impacts on future use during the feasibility study.

General Comments, Sampling Approach

Respondents have planned to collect surface and subsurface samples in different rounds; moreover, the Work Plan presents vague qualifications for when subsurface samples will be taken. As a result, it is not entirely clear whether *any* subsurface samples will be collected by the Respondents. First, it makes little sense to break up sampling into a "surface" and "subsurface" round. Subsurface and surface data are more meaningful when they are taken at the same time because temporal variations can be significant in a river system and contemporaneous sampling eliminates this potentially confounding factor. Second, we know now that some subsurface samples should be taken because data from DEQ indicates a high a likelihood of contamination in subsurface sediments in certain areas. Moreover, subsurface data provide meaningful information on connections between upland sources of contamination for the in-water site.

It is important to bear in mind, that the point of sampling at this time is to identify sources and characterize the nature and extent of contamination. This allows risk analysis to proceed. Based on language in this section (see pages 97-98) and elsewhere, it is not entirely clear whether the Respondents are ruling out some sampling on the basis of a premature "risk" type of analysis. The Work Plan references an analysis that it will conduct (but has not been provided to the governments) regarding Round 1 data and this analysis will be used to "help categorize potential COI sources ***of risk*** based on the extent to which they have been characterized, their regulatory status, and their potential for affecting sediments or river water." The language is somewhat unclear; however, it appears from this text that the Respondents may be prematurely using some type of "risk" screen. Again, the point of the RI at this time should be to identify sources and characterize the nature and extent of contamination in absence of a "risk" screen. Explain how data will be evaluated subsequent to each round of data.

The criteria proposed in the Work Plan for evaluating subsurface sediment chemistry are not complete. Subsurface sediment sampling must be performed to:

1. Fully define the nature and extent of known contaminant releases;
2. Verify assumptions regarding subsurface stratigraphy used for developing the hydrodynamic model;
3. Validate the site conceptual model;
4. Evaluate sediment quality in areas where the hydrodynamic model or bathymetric change assessment indicates sediment scour may occur;
5. Evaluate sediment quality in areas where contaminated groundwater is or may be discharging through clean or impacted sediments;
6. Evaluate sediment quality is areas where potential prop wash, boat wakes, or wind waves may result in erosion of surface sediments and expose underlying sediments; and
7. Evaluate potential dredging or shoreline development areas.

Section 6.3.3, page 99, Types of Data to be Collected in Round 2A- The Work Plan needs to include one additional type of data to be collected in Round 2A (or 2B)….data to calibrate, parameterize, and verify models used in the RI (e.g., hydrodynamic model).

Specific Comments on Section 6

Section 6.0 should be retitled "Risk-based Site Characterization." The section title, Record of Decision is not relevant to the Work Plan.

Sections 6.0, 6.2 and 6.2.1, Page 90 and pages 92-93 - Add text and further describe that an objective of sampling efforts is "to understand the distribution of chemical constituents..."

Section 6.2.1, Page 92 - The text states that "background levels will be established in accordance with EPA guidance..." We agree with this approach. Respondents should propose a specific approach to establishing background levels for various media for Agency review.

Section 6.2.1, page 92, Risk-based Approach to the Record of Decision (ROD) - A key element of the proposed risk-based approach is missing. Without full characterization of the nature and extent of contamination and a solid understanding of the fate and transport of contaminants, a valid risk assessment cannot be completed. A preliminary risk evaluation should be conducted concurrently with the field investigations, to help focus future characterization efforts with respect to potential source areas, contaminants of interest, and receptors and pathways of concern. However, it appears that too much emphasis is being placed on risk assessment too early in the process, in lieu of developing a comprehensive site conceptual model (i.e., nature and extent of contamination and understanding of contaminant fate and transport in the system). It should be recognized that the RI cannot be considered complete until:

i. All potential sources have Been identified (It should be recognized that the RI cannot be complete until all potential sources have been identified and appropriate data collected to determine if they are, have, or can reasonably expected to in the future… contribute to the contamination in Portland Harbor);
ii. The nature and extent (vertical and lateral) of contamination is fully defined for both river-wide and localized areas of contamination; and
iii. River dynamics and contaminant transport are understood in sufficient detail to evaluate sediment stability and to evaluate potential impacts associated with individual sites and their contribution to the contamination in Portland Harbor.

Section 6.2.1, page 92 - It is unclear how Sediment Management Areas (SMAs) will be delineated. SMAs should consider the following:

iii. Physical system;
iv. Habitat;

v. Localized Risks (e.g., principal threat or hot spot);
vi. Human health and ecological evaluations; and
vii. Land and river uses.

Section 6.2.1, page 92 and 93 - The methods and assumptions that will be used to derive PRGs need additional detail, including how PRGs will be developed in relation to a single source/facility in the ISA versus the overall ISA; how the food web model will be used to deal with multiple chemicals at multiple facilities; and how additional sampling needs will be determined. Also, there is a lot of reference to "background" levels. The sampling completed last year by the Respondents will not be sufficient to use for determining "background" levels.

Section 6.2.2, page 93 - This section is not applicable to the RI/FS Work Plan. Neither the AOC or the SOW require a discussion on the Record of Decision. Please delete it from the Work Plan.

Section 6.3.2, Page 98 - The text states that sources and groundwater pathway evaluation "will help select Round 2 sediment and water locations." Although we agree with this approach, the results from the evaluation have not been followed for Round 2 (i.e., the Round 2 field sampling plan was submitted before the Groundwater Data Review Report was submitted).

Section 6.3.3, page 98 - Indicate how the proposed scope of work will be used to validate or refine the Site Conceptual Model presented in Section 5.

Section 6.3.3, page 98 - This section states "Round 2 sampling is intended to gather the majority of the remaining data for the RI and risk assessments..." The scope of work presented in the field sampling plan and the general approach described in this section are inadequate to meet this need. As proposed, the surface sediment sampling is inadequate to characterize contaminant distribution and source effects. A more robust sampling effort is needed to achieve this objective.

Section 6.3.3, page 99 - Based on currently available historical data and ongoing sampling by various parties, subsurface sediment sampling will be warranted as part of Round 2. This will expedite the RI/FS process by providing information about subsurface sediment chemistry earlier in the process.

Section 6.3.3, Page 99 - Subsurface sampling needs to have the following objective: subsurface sediment chemistry to characterize contaminant distribution and source effects to the river. The objective of subsurface sampling should not be qualified with "substantial historic releases are documented." Subsurface sampling is part of source identification and should be conducted at the same time as Round 2A, not after.

Section 6.3.3, Page 99 - The Work Plan must discuss the types of samples that will be collected to meet the objective, "[e]valuate the impact to sediments and environmental receptors from groundwater chemicals discharging from upland areas...."

Section 6.3.3., page 99 - One type of data that is listed to be collected in Round 2A is "Limited qualitative survey to better understand fish and shellfish consumption practices in the ISA." EPA's position on this issue was discussed extensively in the human health subgroups and is found in the comment on Appendix D (Section 3.5.1.4). EPA will not accept the data from limited qualitative surveys to develop biota ingestion rates nor to compare to existing well done studies. We strongly discourage the Respondents from conducting such surveys since the data will not be used as a part of the RI or risk assessment.

Section 6.3.3, page 99 and Section 7.2, page 112 - The proposed Round 2 Work does not specifically address several outstanding issues identified in previous comments, Nature and Extent Subgroup meetings, and EPA's response to Respondents Issue Papers including:

i. Evaluation of upstream sources of contamination. How will information regarding upstream sources be used to evaluate the possible expansion of the ISA and to assess the potential for recontamination of sediments within Portland Harbor?
ii. Sampling Approach – the Work Plan does not adequately describe the "overall sampling approach" for delineating "hot spots" or principal threats;
iii. Defining sediment management areas;
iv. Identifying additional sources of contamination to or within Portland Harbor;
v. Assessing impact of major utility crossings across the river as either contamination sources or preferential contaminant migration pathways;
vi. Approach for expanding or refining the limits of the ISA;
vii. Evaluating identified seep areas; and
viii Assessing impact of contaminated groundwater discharge on sediment or surface water quality.

Section 6.3.3, Page 100 - According to Appendix A, Attachment 2 (FS-related data evaluations), one of the objectives for Round 2 sampling is to obtain sediment volume and characteristics. How will that be completed without field data collection as stated on page 100?

Section 6.3.5, page 101 - Under "Human Health," it is not clear what "site specific data" will be substituted for "conservative defaults". As discussed in the comments on Appendix D, any data collection efforts that will be used to modify exposure parameters for the risk assessment should be discussed with EPA and its partners and a Work Plan prepared prior to data collection. Under the toxicity assessment bullet, remove the word "incidence" and replace with "probability" or "likelihood." The purpose of the toxicity assessment is to "weigh available evidence regarding the potential for particular contaminants to cause adverse effects in exposed individuals and to provide, where possible, an estimate of the relationship between the extent of exposure to a contaminant and the increased likelihood and/or severity of adverse effects (RAGS, part A)."

Section 6.3.6, page 102 - How will "Sediment management areas with relatively high risk" be

defined? How will these be characterized as having "high risk" given the limited sediment sampling, both laterally and at depth?

Section 6.3.6, Page 103 - Although we generally agree that the Respondents do not need to perform "extensive independent evaluations of groundwater sources through this RI/FS," part of a remedial investigation is to define the nature and extent of contamination. Therefore, if there is a data gap that requires in-water samples (sediment, porewater, groundwater or surface water), then ultimately the Respondents are responsible for collection of this data.

Section 6.3.6, page 103 - Add a bullet to indicate that the identification of upstream or downstream sources could result in the expansion of the site.

Section 6.3.7, page 104 - The first bullet under Round 3 should be completed in Round 2 for known sources. Determining the nature and extent of contamination for known sources that have not been well-defined is critical to moving this RI/FS forward in a timely manner.

Section 7 - Site Characterization Approach

Section 7.2.1, page 110 - The amount of historical sediment data for Portland harbor should not be characterized as "significant". There is very limited data in major portions of the site when considering the size of Portland Harbor. Also, many of the sampling locations have limited chemical analysis or have very high detection limits for the chemicals that were analyzed.

Section 7.2.1, page 110 - In order to understand the chemical distribution and sources of contaminants in Portland Harbor, a systematic approach to sediment sampling should be implemented. This approach should be devised so that new sources can be identified and nature and extent of contaminants associated with existing sources can be better characterized. EPA will provide additional comments on a recommended approach for sampling on the FSP.

Section 7.2.1, page 111 - "To support the ERA, additional Round 1 sediment samples were collected at locations where sculpin, crayfish, clams, and other benthic infauna were found, and in potential wildlife exposure areas." The text should indicate that clams and other benthic infauna were not collected at most stations, and that additional sampling will be necessary. Additionally, these locations were selected because they typified contamination sources and had habitat that supported biota. The text should also be revised to state that Round 1 sediment sample locations do not represent all exposure areas. More tissue sampling may be needed if a strong correlation between tissue and contaminants is not found.

Section 7.2.1, page 111 - Under 2nd bullet, top of page, although characterization of subsurface sediments is a goal, no subsurface sediments are proposed for collection in Round 2A. In order to complete the RI/FS in a timely manner, subsurface characterization of sediments at known sources should proceed. Under "Data Needs," subsurface samples are identified as required to

understand historic sources; however, under "RI/FS Tasks," Round 2A will address only surface sediments to understand sources. Subsurface sediment chemistry data will be needed at many locations throughout the ISA to understand sources and to understand the nature and extent of existing contamination.

Section 7.2.1, Pages 111-114 - Subsurface sampling should also be based on the bullets listed under the surface sampling approach on page 112.

Section 7.2.1, page 112 - "Round 2B will involve collection of subsurface cores to evaluate subsurface distributions of chemicals in areas where those sediments could act as sources and in navigation or maintenance dredge areas." Refer to comments regarding subsurface sampling for page 66, Section 6.3.3.

Section 7.2.1, page 112 - This page addresses how erosional/accreting areas will be targeted for sampling. Erosional (scour) areas will be sampled at the subsurface while accreting areas will be sampled at the surface. This rationale is faulty for a variety of reasons. First, the resolution of the bathymetric data may not be good enough to identify points at which samples should be collected. Secondly, sampling accreting areas at the surface may result in "clean samples" from material that has deposited from elsewhere in the river, while an ongoing source (e.g., groundwater) may result in deeper contamination. A mixture of surface and subsurface sediment chemistry combined with bathymetric and hydrodynamic information may be needed to characterize sources and areas of contamination.

Section 7.2.1, page 113 - The fish tissue analytical results also may be useful in identifying sediment areas for quantitative evaluation of these chemicals.

Section 7.2.1, page 113 - Remove the statement " While remedial investigations typically focus on surface sediments...". Most sediment RIs strive to define nature and extent by sampling at the surface as well as at depth. Examples of such work within the site is that being done at Atofina and previous work at McCormick and Baxter.

Section 7.2.1, page 113 - The paragraph starting "During Round 2B, cores…" appears to be missing text.

Section 7.2.1, page 114 - Depth data must be collected in Round 2 to adequately characterize nature and extent of potential SMAs. Therefore, please delete the following sentence: "If dredging is a reasonable remedial alternative for one or more of the SMAs, then subsurface chemical data will be collected during Round 3 and the RD/RA to determine the depth to which contamination extends..."

Section 7.2.2, page 115 - The Work Plan states under "Data Needs" that "…this does not include identifying or characterizing individual sources along the ISA or upstream of the ISA. This

information will be submitted for DEQ to follow-up with source control measures..." Understanding contaminant sources or inputs into the river are the Respondents' responsibility under the AOC and fully defining the nature and extent of contamination within the river includes characterization of surface water quality adjacent to individual sites and particularly those sites with known sediment and groundwater contamination (e.g., Gasco, Atofina). While DEQ will be identifying, evaluating, and requiring some source control actions be implemented, some final remedial actions will not be determined until the Portland Harbor ROD is completed.

Section 7.2.2, page 115 and Section 8.7.4, page 145, Recontamination - The Work Plan states under "Data Needs" that "….This information will be submitted for DEQ to follow-up with source control measures and to understand the potential future recontamination of any remedial alternatives." This section does not describe what actions will be taken by the Respondents to specifically evaluate the potential for recontamination or for source evaluation. These activities will not be fully addressed by DEQ's upland activities as suggested. The Work Plan should consider recontamination associated with uncontrolled sources, groundwater discharge through contaminated sediments, outfalls, bank erosion, and over-water activities.

Section 7.2.3, page 116, Problem Description - "Toxicity and risk of such chemicals (groundwater) can be effectively assessed through chemical analysis or toxicity testing of bulk sediment samples." This is true if the sediment samples are placed at groundwater discharge areas, however these areas have not been identified yet. Additional sediment samples will be required after these areas are identified. If this work is not completed expeditiously, it will hold up the completion of the risk assessment.

Section 7.2.3, Page 116, Groundwater - There is a dichotomy in the next two paragraphs which needs fixing.

> "The potential for chemicals associated with contaminated groundwater to affect risk is highly dependent on the characteristics of the contaminants being introduced to the sediment. Groundwater contaminants with low water solubility and high soil adsorption coefficients will preferentially sorb to sediment particles, and only a small fraction will partition to porewater. Metals and hydrophobic organic contaminants typically have low mobility and high sediment sorption characteristics. For these chemicals, the concentration in porewater is controlled by the rate at which the chemical desorbs or dissociates from the solid phases and becomes available in porewater to benthic infauna. Toxicity and risk of such chemicals can be effectively assessed through chemical analysis or toxicity testing of bulk sediment samples."
>
> "Conversely, groundwater contaminants with high water solubility and low soil adsorption coefficients may not sorb to sediment, but may affect porewater concentrations as contaminated groundwater moves through the Transition Zone. Other factors such as organic carbon content of the sediment, volatility and degradation of the groundwater contaminant(s), and co-solvency mechanisms, will also affect the fate and

transport of groundwater contaminants through the Transition Zone. Concentration of such chemicals in porewater is more likely to be affected by the rate at which they are being introduced to sediments by contaminated groundwater flow (i.e., advective transport). Such chemicals may not be identified in bulk sediment samples, and separate sampling methods may be necessary to estimate exposure where such contamination may occur and present a risk to benthic infauna."

Section 7.2.3, Page 116, Groundwater - This paragraph ignores the loading of contaminants to the river and its sediments, and suggest that they are other focus which need to be included. "Identification and analysis of risks associated with contaminated groundwater sources is a primary focus of the groundwater components of this RI/FS. Groundwater-related components of the RI/FS will focus on collecting the data and information needed to assess two risk-related endpoints: benthic biota exposure to COIs that migrated to the river through discharge of contaminated groundwater, and human exposure to shoreline seeps containing COIs in human use areas. Potentially, the..."

Section 7.2.3, pages 116-123 - We do not agree with the approach that the data gaps for groundwater nature and extent are the responsibility of DEQ. If a data gap exists that suggests that contamination is impacting the river and its sediments, then Respondents are responsible for determining the nature and extent of the contamination. We also disagree that risk, human or ecological, is determined prior to determining the nature and extent of the contamination.

Section 7.2.3, page 117 - The bulleted list of scenarios where groundwater discharging to the river could be a problem should include direct toxicity to amphibians and fish, particularly in more quiescent areas of the site.

Section 7.2.3, Page 117, Groundwater - Unique Regulatory Framework for Groundwater- We do not agree that the Portland Harbor RI is modeled after the Lower Duwamish Site. It may turn out to be similar in the future, but the process development, the different amounts of sediment and ground water site data available for each upland project, and the sequence of the sampling requirements is not necessarily the same. In addition, the State regulations which may come into play in each state are different for the two sites. We suggest that the following section be deleted. ~~"The overall approach adopted for evaluating effects of groundwater on sediments is modeled after the approach used at the Lower Duwamish Waterway Superfund Site, a large contaminated sediment site in Seattle, WA, also being evaluated in EPA Region 10.~~ The approach also is consistent with the tiered approach for groundwater/surface water assessments recommended by EPA (2000b). The approach requires...."

Section 7.2.3, page 117, Groundwater in the RI - In the "Unique Regulatory Framework for Groundwater" section it is stated that the Respondents will assess the potential of groundwater from pertinent upland sites that could result in unacceptable risks to human or ecological receptors. The Work Plan does not indicate how the Respondents will define "pertinent" or how

risks associated with groundwater will be assessed. It cannot be assumed for the purposes of the risk assessment or feasibility study that all groundwater inputs to the river are controlled. Groundwater discharges must be defined, characterized, and evaluated by the Respondents throughout the RI, risk assessments, and feasibility study.

Section 7.2.3, page 117 - The Work Plan states that "The LWG is also working with DEQ to assess the potential for unacceptable risk at sites where data on groundwater contamination may be limited." It is unclear what the Respondents mean by this statement or what ongoing work the Respondents think is occurring. This sentence should be clarified or deleted.

Section 7.2.3, Page 118, Groundwater, Data Needs - Information regarding the groundwater physical system and existing groundwater quality data are being compiled from DEQ files and published literature." This sentence needs to be revised to include the following "and will be augmented by Remedial Investigation characterization tasks."

Section 7.2.3, Page 118, Groundwater**,** Data Needs - "Sampling is expected to be considered for locations offshore of upland sites where groundwater COIs are confirmed to or have a reasonable likelihood to reach the Transition Zone within the river." Add the following: "and at sufficient other locations to facilitate appropriate characterization."

Section 7.2.3, page 118, Surface Water Groundwater Transition Zone - No discussion is presented on the importance of coordinating the surface water and groundwater transition zone sampling or potential methodologies for collecting groundwater data (water quality samples, flux measurements, gradients, etc.).

Section 7.2.2, page 119 - For human health risk assessment (task 3), EPA and the Respondents have not had any discussion as to what methods will be used and exposure assumptions assumed when evaluating seeps for potential human health risks. A methodology should be proposed by the Respondents. After input from EPA and its partners, the methodology should be included in the final human health risk assessment Work Plan.

Section 7.2.3, page 119, Offshore Stratigraphy and Groundwater Discharge - The RI/FS should include fully defining the nature and extent of groundwater contamination and its impacts on sediments. Understanding the stratigraphy offshore of individual facilities and groundwater discharges areas will be critical in selecting sampling locations. The Work Plan does not include the use of a towed probe or thermal flyover to identify significant areas of groundwater discharge as discussed numerous times within the Groundwater Subgroup. Groundwater discharges must be evaluated on a localized scale.

Section 7.2.3, page 119, Groundwater Plume Characterization - The general approach for groundwater plume characterization should be presented in the Work Plan (e.g., methods, scale, relationship to upland work; offshore stratigraphy; groundwater/surface water interactions). The

chemicals of interest (COIs) should be selected on a site-by-site basis – limiting the analyses to just VOCs or other more hydrophilic chemicals is not appropriate at this time. PAHs and metals or compounds that may be transported due to co-solvency should also be investigated. Again, it is unclear why the evaluation of groundwater discharges to the river should be evaluated by DEQ – in this context it does not appear to be a source control activity and therefore should be the responsibility of the Respondents.

Section 7.2.3, Page 119, Groundwater, RI/FS Tasks- 2. Ecological Risk Assessment: This section needs to add "initial" to the following sentence. "Uses results from the groundwater data review to identify "initial" areas to be evaluated for ecological risk from groundwater contaminants."

Section 7.2.3, Page 119, Groundwater, RI/FS Tasks- 3. Human Health Risk Assessment: Change the following sentence as indicated – "Also uses results of groundwater data review (and direct inspection at low water, along with sampling to identify other areas of potential concern) to identify seep areas where evaluation of risks to humans from direct contact should be evaluated."

Section 7.2.3, Page 121, Step 1. Groundwater Data Review - The prioritization concept mentioned in the following paragraph needs much more detail. We suggest that for starters there should be tables which compare the contaminants at upland sites to acceptable water quality criteria, and that there should be sufficient upland characterization at sufficient monitoring wells or other sampling locations for the concept to be acceptable. The present paragraph which should be revised is the following – "Sites where COIs are present in groundwater but where available data are insufficient to assess the potential for COIs to reach the river will be referred to DEQ for additional assessment. The prioritized sites identified through application of these criteria will be used to help focus the evaluation of the effects of COIs in groundwater."

Section 7.2.3, Page 121 - The use of "conservative screening criteria" for use in screening groundwater is mentioned on this page and page 122. EPA and its partners will need to review these criteria before they are used. Also, it has not been decided that the dermal route of exposure is the only route of concern for human health. For human exposure to seeps, both the criteria to be used for screening and the methodologies to assess risk need more discussion.

Section 7.2.3, page 122 - While K_{ow}, $K_{d,}$ K_{oc} and other chemical/physical parameters of a chemical in groundwater are very important in determining what media (sediment versus water) these contaminants will partition into, other determinants (e.g., the presence of other contaminants, sediment characteristics) may influence partitioning and, therefore, influence what media need to be sampled.

Section 7.2.3, page 122, Have all Seeps in the ISA been Identified - Will the Respondents rely on the results of their initial seep reconnaissance survey to conclude all seeps in the potential human

use areas have been identified?

Section 7.3.3, page 124, Pore Water as Exposure Medium - The referenced text states that chemicals in sediments and surface water may have adverse effects on ecological receptors. The Work Plan neglects to include pore water.

Section 7.3.3, page 124 - What data is this statement based upon? "Although groundwater is not anticipated to directly affect ecological receptors..."

Section 7.4.3, page 127 - It is not clear what is meant by the following statement: "Fish consumption practices in the ISA.....need to be characterized.." Fish consumption surveys/ studies that are not robust and statistically based should not be used to characterize consumption practices. This issue is discussed in the comments on Appendix D.

Section 7.4.4, page 127 and 128 - Before any historic category 1 data can be used to support the HHRA, EPA must review the data and approve its use in the risk assessment.

Section 7.4.3, Page 127 and Section 7.4.4, Page 129 - Explain why a model with numerous assumptions is more accurate than a calculated site-specific BSAF.

Section 7.4.4, page 128, item 4, last two sentences - The second to last sentence implies that the upstream tissue data was collected as part of the EPA approved Round 1 sampling. EPA did not approve the Respondents' collection of upstream fish tissue data during Round 1 or its use in estimating background tissue conditions. The use of the data following the baseline risk human health assessment is therefore questionable.

Page 128, Section 7.4.4 (task 4) - The words "limited qualitative survey" should be rewritten to make it clear that this was an interview with two to three people.

Section 7.4.4, p. 129, #5 (top of page) and #2 (middle of page) - Seeps were identified at 12 of the beaches identified as human use areas. Because of the number of locations where seeps may be contacted by people, exposure factors for contact with seeps should be developed in consultation with EPA.

Section 7.4.4, page 129, #1 - Provide the results of the comparison of beach composite concentrations to Region 9 PRGs. This directly impacts the FSP for Round 2.

Section 7.4.4, page 129, #3 - Because EPA communicated to the Respondents that surface water ingestion by transients occurs at the site, references to "incidental ingestion" of surface water should be removed from the text. If someone is using the Lower Willamette as a drinking water source, then their ingestion would be "intentional" not "incidental."

Section 8 - Feasibility Study Approach

Page 134, Section 8.2 - See EPA's comments on RAOs for Section 6.1 and Appendix A, Attachment A1.

Page 139, Section 8.5.3 - Groundwater flux evaluation for natural attenuation is required, not optional.

Section 8.6.3, page 140 - The types of evaluations needed to delineate SMA are listed in this section. While we agree in general with these evaluations, we do not agree that the sampling proposed in this Work Plan will allow for such evaluations, including those to delineate sediment volumes (vertical and horizontal) that pose unacceptable risk and those for evaluation of remedial alternatives.

Section 8.6.4, page 142 -144 - EPA does not agree that the historical data in combination with the data collection proposed by the Respondents for phase 2 "can be used to define preliminary SMAs at the end of Round 2 sampling that accounts for unacceptable risks and physical components of the site". Also, the data will not be sufficient in many areas, especially those near sources, to have any confidence in the use of the mapping exercises described on page 143 to define risk areas. We also do not agree with postponing until Round 3 the subsurface coring "to specifically determine the depth of contamination in SMAs that appear to be potential candidates for dredging". Much of this coring needs to be a part of the nature and extent component of Round 2.

Section 8.7.4, page 145 - The bulleted list of data to be considered in the recontamination evaluation should include an assessment of the chemical concentrations of likely sources of sediment to the river. Sediment traps will tell you what is entering this river this year, but we also need to predict what will enter the river during high water years. The hydrodynamic modeling will show us where the sediments entering the site come from; we may need to sample the significant sediment source areas in order to understand the likely inputs to the site.

Section 8.10, Early Actions - See our comments on Appendix B.

RI Work Plan Tables

Table 2-2, Date of Acoustic Doppler Current Profiler- This table should include the date of the ADCP Transect and a reference to who performed the work.

Table 3-2, COI Added to Selected Industries- The following changes should be incorporated into

the referenced table:

Metals Salvage/recycling	Add Phthalates
Metals forging, fabrication, plating	Add VOCs, cyanide
Marine Construction/repair	Add PCBs, phthalates, VOCs, SVOCs
Electrical Power Generation	Add PCBs, PAHs
Electrical power substation operations	Add SVOCs
Railroad Switching, shipping, maintenance	Add PAHs, metals, SVOCs, VOCs
Ship Building and dismantling	Add TPH and metals

Table 4-7d - For example, this data indicates levels of dioxins/furan congeners in water samples collected from the Rhone-Poulenc site. Despite the concentrations noted, the Number Detected field states that 0 were detected for some congeners. Also, clarify whether the results include detection limits for some congeners.

Table 7-3 - DQO Step 2 - Change last statement to “determine whether contiguous contamination posing unacceptable risk extends beyond the ISA.”

Table 7-3, Step 4 - "Subsurface sediment is defined as sediment from 30 cm below the mudline to native layers." Contamination does not necessarily stop when it hits a native surface - this is particularly true for DNAPL. The text here should define subsurface as anything deeper than 30 cm.

Table 7-3, Step 5 - "Historic data for each chemical are acceptable when they are within the same range of concentrations over time …" This statement is meaningless without defining the range and period of time that concentrations are expected to remain stable.

Table 7-4, Step 6. Surface water sampling should capture low flow and high flow conditions, as the Work Plan points out here. Additional sampling may be needed to capture seasonal changes in water quality.

Table 8-2 - Mixed Layer Depth is listed as a data gap here, but elsewhere in the Work Plan, the SPI and bathymetric change data are used to support a mixed layer depth of one foot across the site. What additional work to be conducted to refine the mixed layer depth.

Table 9-1 – The contact for the Confederated Tribes of the Warm Springs Reservation of Oregon is Brian Cunninghame, 541-490-2009, 5520 Skyline Drive, Hood River, OR 97031
(b) (6)

Table 9-1 – The contact for the Confederated Tribes of the Grand Ronde Community of Oregon is Rod Thompson, 503-879-2385, 47010 W Hebo Road, PO Box 10, Grand Ronde, OR 97347, rod.thompson@grandronde.org

Table 9-1 – Correct the name: The Confederated Tribes of Siletz Indians of Oregon
Table 9-1 – The contact for the Nez Perce Tribe is Rick Eichstaedt, 208-843-7355, P.O. Box 305, Lapwai, ID 83540, ricke@nezperce.org

Table 9-2 - Required deliverables - Delete Ecological Preliminary Risk Evaluation report (not an AOC deliverable). Add the analytical data footnote to this table.

RI Work Plan Figures

Figures 2-2a and 2-2b, The referenced figures should specify the river stage.

Figure 2-8, The referenced figure should specify the bathymetric units and datum.

Figure 2-9, The referenced figure should define the term "fines" (i.e., does this mean less than a 200 sieve size?).

Figure 4-38, Add bioassay data from the Zidell site (RM 14-15).

APPENDIX A: Feasibility Study Work Plan

Page 4, Section 2.4 – According to the three-step process for natural attenuation data needs, Step 1 is to occur before sampling in Round 2A. If areas have been identified that are potentially suitable for natural attenuation based on general information about the river system, these areas should be shown and sampling proposed in Round 2A to fill data needs.

Section 2.5, pages 6 and 7, Table 1, and elsewhere in this chapter - The references to "background levels" in this attachment should be deleted. The quotes from the 2002 EPA guidance, "Role of Background in the CERCLA Cleanup Program", are taken out of context and should not be part of this preliminary RAO discussion. The 2002 guidance makes it clear that background concentrations and related risks do have a role in our risk assessments and risk characterization, and, may, in appropriate situations, have a role in our risk management decisions, including establishing clean up levels that meet ARARs and acceptable clean up levels, as defined by the NCP. However, it is not appropriate at this stage of the RI/FS work to state that the RAO is limited to background levels because our decision how and when it is appropriate to integrate background concentration issues into our remedial decisions will need to consider many factors, including those which will be analyzed in the RI/FS

Figure 1 – The Natural Attenuation Data Gaps box needs to be bolded.

Attachment A1: Preliminary Draft Remedial Action Objectives Technical Memorandum

Section 2.4, page 5 - The bulleted items "Working Waterway" and "Physical System" must be deleted. Likewise, the last paragraph of this section should be deleted too. Remedial Action Objectives are media, pathway, and chemical objectives as discussed in EPA's 1988 guidance which is referred to on page 2 of this section. These "other considerations" also do not comply with Section 4.6.1 of the SOW. EPA can support that Natural Resource Damage Assessment issues should be coordinated with possible NRDA projects.

Section 2.5, page 7 - Delete the last paragraph starting with the sentence "In addition to the RAOs, we propose the following general objectives for the remedial action: . . ." See previous comment.

Pages 12-13, Section 4.3 - A three-step process is described for evaluating natural attenuation. Although chemistry is mentioned in relation to the surface sediment, there does not appear to be much discussion of how chemical processes will be evaluated. Specifically, there is no mention of evaluating contaminant degradation rates or evaluating the potential of contaminants to dissolve into porewater and migrate to surface water. There is also no discussion that subsurface contamination will be evaluated.

Section 5, page 15 - A statement at the end of this page should be added that indicates that as more information is developed and alternatives are considered, additional ARARs may be identified and/or certain ARARs in Table 2 may be deleted.

Section 5, Table 2, pages 16 through 23 - Specific comments on the ARARs chart follow:

i. 40 CFR Part 230, the Section 404(b)(1) Guidelines should be listed as these regulations. The guidelines are applicable to the specification of disposal sites for discharges of dredged or fill material into waters of the United States and for discharges of dredged or fill material into navigable waters of the United States.

ii. Clean Water Act Section 401 should be listed as an ARAR as it applies to any discharge of a pollutant from a point source and would require that such discharge comply with state water quality standards.

iii. Along with 40 CFR Part 6, App. A - Include Executive Orders 11988 and 11990, which require federal projects to avoid adverse effects and minimize potential harm to wetlands and within flood plains.

iv. Section 10 of the Rivers and Harbors Act should be specified as the potential ARAR. This

section may be applicable for any action that may obstruct or alter a navigable waterway.

v. Provide the rationale for listing the National Primary and Secondary Ambient Air Quality Standards, and why the standards would not apply. Also list the potential air regulations that may apply to a source.

vi. The summary of the Endangered Species Act is not quite accurate. Please revise the summary to indicate that actions authorized, funded or carried out by federal agencies may not jeopardize the continued existence of endangered or threatened species as well as adversely modify or destroy their critical habitats. Additionally, the Comment section should note that although no independent consultation and biological assessment with the services may be required of the Respondents, the Respondents likely will need to prepare a BA for EPA to consult with the services and for the impacts of any remedy to be assessed.

vii. 40 CFR 261.24 should be added as a potential ARAR. The TCLP test for contaminant leaching triggers handling and disposal requirements if contaminated sediment or soils are disposed in a land-based disposal site.

viii. Delete the Water Resources Development Act from the list of ARARs.

ix. The Respondents should be more specific as to which provisions of the Oregon Environmental Cleanup Act they propose are ARARs as being more stringent than federal law or regulations or other chemical-specific or action-specific ARARs. The procedural requirements of the Act are not ARARs.

x. The Flood Insurance Act may be an ARAR. This program provides federal flood insurance to the City of Portland and requires that the City not allow fill in the river that would cause in increase is the flood rise. This may limit the size and locations of caps in the river.

xi. Add 40 CFR 257, Subpart A to the list of ARARs since in some situations it maybe an ARAR for solid wastes that are not addressed by the State of Oregon solid waste regulations.

Table 2, page 22 - Under the Statewide Water Quality Plan, change the text of the comment to: "[w]here Federal and State water quality criteria differ, the most stringent will be used." There has been no discussion or approval of what the Respondents consider to be "the most scientifically sound."

Table 2- Total Maximum Daily Loads (TMDLs)- TMDLs should be included in the "Water Quality" section of Table 2.

Attachment A2: Draft Proposal Facility Siting Technical Memo

Section 2 - The referenced text should include a discussion of DEQ's solid and hazardous waste requirements for disposal facilities.

Section 4, page 9 - The upstream limit in the Columbia River should be extended east of the Cascade mountain range. Landfills located east of the Cascade mountain range have been known to accept contaminated sediments for disposal with little or no de-watering. This may significantly reduce disposal costs. The downstream limit in the Columbia should also be extended due to the relatively low costs associated with barge transport.

Section 4, page 10 - It is unclear why a one-mile distance from the river's edge has been selected for the location of new upland disposal sites. A more reasonable distance of 10 miles should be provided.

Section 6, Page 12 - Preliminary screening should be based on a weight of evidence approach. No one criteria should be used to eliminate a potential disposal site from further consideration. Instead, potential disposal sites should be evaluated against all criteria and then ranked.

Section 9.4 - The final disposal site ranking should be conducted concurrently with the FS such that ranking criteria can be refined by FS information (e.g., sediment volumes, etc.). Figures 1 and 2 may be indicting this, but it is not clear.

Figures 1 and 2, pages 7 and 8 - Information obtained to support the FS may affect the final site ranking. As a result, the flow charts depicted in Figures 1 and 2 should include a process for feeding FS information back into the final site ranking process. In addition, Figure 1 should recognize that additional sampling activities to support the FS may be required.

Attachment A3: Draft Capping Material Evaluation Technical Memo

Sections 1 and 3 - The referenced text states that for the purpose of the Attachment, "clean" is defined as material that is determined to be suitable for open water disposal when compared to the Dredged Material Management Program (DMMP) Screening Level criteria put forth in the Lower Columbia Dredged Material Management Framework (USACE, 1998). The proposed definition of "clean" for purposes of capping material may not be appropriate at this stage of the investigation and should be developed based on further discussions with the agencies.

Section 1, page 1 - In some cases, material which is deemed clean enough for open water disposal may exceed risk based cleanup levels developed for Portland Harbor. Capping material should meet Portland Harbor risk based goals or DMMP levels, whichever are lower.

Section 2.1.2, page 4 - Though typically smaller in volume, the attachment should acknowledge that private maintenance dredging activities may also be a source of capping material.

Section 4 - The Work Plan should include a discussion of how capping may affect future navigation/maintenance dredging needs.

Attachment A4: Preliminary Draft Natural Attenuation Data Gaps Technical Memorandum

Burial of Contaminated Sediment - The focus of the proposed natural attenuation approach seems to be burial of contaminated sediment by natural sedimentation processes. This mechanism may have limited applicability and should include an evaluation of other physical processes that could expose or remove such sediment.

Section 2, page 3 - Included in natural attenuation processes are "Diffusion/advection of chemicals to the water column (i.e., loss to the water column)" and "Transport (erosion) of sediments containing chemicals and dispersion over wider areas at lower concentrations." The document should acknowledge that these may be highly undesirable processes because they can cause direct risk and spread contamination over a large area.

Section 3.3, Additional Sources of Sedimentation - In addition to sedimentation from up-river sources, sedimentation from upland runoff should be considered.

Pages 3-6, Sections 2.1 and 2.2 - Natural attenuation should include and evaluation for areas that have contaminants in surface or subsurface sediments that would release dissolved chemicals into the surroundings either through diffusion or advection.

Pages 6-7, Section 2.3 - SEDCAM modeling (with the assumptions listed) does not include the situation where contaminated sediments are immediately below the “mixed layer” and could continue to provide dissolved contaminants to the “mixed layer” and river. SEDCAM modeling may be limited to conditions where contaminants exist only in the surface sediments and not in the subsurface.

Section 2.3, page 6 - The sedimentation rate will be very difficult to estimate, due to the dynamic nature of the river. Respondents should include sensitivity analyses early in the modeling efforts to determine how inaccurate sedimentation rates will effect the outcome.

Section 2.3, page 7 - The Boudreau model has not been previously discussed and cannot be approved at this time. More information needs to be submitted in order to evaluate this model and determine model inputs.

Page 8, Section 2.4 - Chemical concentrations in subsurface sediments should be considered and included in the bulleted list.

Page 9, Table 1 - List subsurface sediment chemistry and groundwater chemistry/flow as a "Data Need."

Page 11, Section 3.7 - Groundwater advection must be considered for potential natural attenuation areas.

Section 3.7, page 11 - This section lists the velocity of groundwater as a data gap. Measuring the velocity of groundwater in nearshore areas with tidal pumping is very difficult. Both the direction and rate of groundwater movement can change over the course of a day.

Page 12, Section 4 - Last sentence of first paragraph in Section 4: "Depending on the

Pages 12-14 - Table 2 needs to include subsurface sediment chemistry and groundwater chemistry and flow. Section 4.2 should also include subsurface sediment chemistry. Additionally, change "No specific data collection is proposed for this variable" to "Data may need to be collected for this variable."

Page 15, Section 5 - The text states that "natural attenuation via downstream sediment transport may be a viable GRA for that area." Sediment scouring is not an appropriate remedial option.

Appendix B - Preliminary Draft Potential Early Action Identification and Evaluation Technical Memorandum

The analysis does not sufficiently consider human health and environmental risk reduction as a factor in identifying early actions. The analysis focuses more on enforcement and non-risk reduction factors which, not surprisingly, results in no candidate sites. It is acknowledged that Early Actions would be conducted separate from the RI/FS process. Therefore, we are not requiring revisions to this section of the document and are directing Respondents to delete the Early Action section from the Programmatic RI/FS Work Plan. EPA continues to seek Respondents to identify sites where early risk reduction and elimination of significant sediment sources to the river should occur. As information is developed about the site and sources to it, EPA can also determine when and where Early Actions are necessary.

Appendix C - Ecological Risk Approach

General Comments

Much of the information provided in Appendix C is acceptable as a general approach, however in many instances insufficient information is provided to assess the approach thoroughly. All the

methodology needs to be documented in detail and approved by EPA and its partners before an ecological risk assessment can be conducted. Separate comments on the Benthic Approach Technical Memorandum, which was submitted to EPA on May 28, 2003, will be provided.

Some historic data has been upgraded from category 2 to category 1 and was recently submitted for review. We need to review this information and supporting rationale before it is possible to determine what data are appropriate for inclusion in the Ecological Risk Assessment.

A benthic community analysis was presented in this Work Plan, however issues remain on obtaining benthic tissue and it is unclear how the benthic community information that has been collected will be used.

An approach to evaluate exposure of receptors to dioxin-like compounds (dioxins, furans, and planar PCBs) needs to be added to the risk assessment. The approach should include a derivation of Toxic Equivalent (TEQ) values based on ecologically relevant Toxic Equivalent Factors (TEFs) from the World Health Organization, and the process should be explained in the risk document.

Toxicity Reference Values (TRVs) - The TRV selection process provides the basis for which exposure point concentrations will be compared with toxicity information in order to calculate risk. The Work Plan appendix describes the development of a preliminary risk assessment. However, the TRV selection process is not included (Attachment C6 gives only a general overview). The rules to select TRVs should be revised and more information is needed describing how TRVs will be used in the risk evaluation. We do not agree with the rules as written in the Work Plan because they prevent field studies, or published hazard assessments that derive threshold levels based on reviews of laboratory and field data, from being used in the assessment. For example, a risk evaluation to represent piscivorus bird exposure to bioaccumulative compounds should be based on the most sensitive endpoint (i.e., reproduction). The bioaccumulative chemicals DDE, PCBs, dioxins, and furans cause mortality or other impacts to the developing embryo or egg at lower levels than would impact adult birds through dietary exposure. Therefore, TRVs and no- or low-effect levels should be selected based on concentrations known or estimated to impact the developing embryo or egg. As currently written, the TRV rules would prevent an evaluation of this type of risk, and piscivorus birds and endangered species would not be protected or represented. In addition, no controlled laboratory study results are available for most endangered species and the surrogate process described by the Respondents is inadequate. Proposed TRVs (including TRV rules) should be submitted in a Technical Memorandum and approved before conducting the risk assessment.
Preliminary Risk Assessment (PRE) - The PRE appears to refine and narrow the scope of future sampling rounds and evaluations. Given that the PRE is proposed to be released in the fall of 2003, it is a fair assumption that it will be based solely on historical data and the results of Round 1 sampling that took place in the summer of 2002. Some organisms have sediment exposure as a major route of exposure (e.g. the sandpiper). Since the goal of the PRE (page 5, Section 1.5) is

to “identify any potential receptors, pathways, media, and exposure scenarios that may have a potential for risk”, the PRE should not be submitted until adequate nature and extent of contamination has been established for the site.

Assessment Endpoints and Level of Protection - The document mixes “community” and “population” level terms, and what it means in an ecological risk assessment that is very ambiguous. Several species are now listed to be assessed at the community level, including amphibians and reptiles. In addition, amphibians are cited as a surrogate for reptiles, which may not be appropriate given that reptiles are longer lived and may be more susceptible to the effects of bioaccumulative compounds.

Food Web Models - The use of a food web model is mentioned several times in this document as a way to relate sediment chemistry to tissue concentrations. Detailed information needs to be provided that outlines how a food web model is proposed to be used in Portland Harbor, and how it will be parameterized to be site specific. This information is needed as soon as possible, because data needed to support the model should be collected during field sampling. The details of the food web model proposal, including model parameterization, should be submitted in a Technical Memorandum and approved before the appropriate field sampling event.

Exposure Units - For each receptor included in the ecological risk assessment (ERA), home range and exposure units need to be clearly defined. The Work Plan should outline this information, so that this information can be reviewed in conjunction with the FSP. Without this information, it is impossible to evaluate whether the FSP will meet the objectives of the assessment endpoints outlined in this document. Maps should be provided that clearly outline the habitat and receptor home range.

Scale of the Assessment - The Work Plan consistently refers to assessing risk at the scale of the entire ISA. It should be noted that the scale of the ISA may be larger that the home range of a receptor of interest. Therefore, the scale should be defined in ecological terms, and not just the size of the site. “Risk drivers” may change for different areas of the river and that we are not just interested in “harbor-wide risk drivers” - localized effects should be considered.

Specific Comments

Section 1.3, Page 3, bulleted list at bottom - This list should include gathering site-specific ecological or natural history information on the selected receptors to be used in the risk assessment to provide a better representation of receptor use and risk. Literature values taken from the *Wildlife Exposures Handbook* may not be as appropriate as site-specific values. Site-specific data should be obtained on foraging habits, home range, habitat use, identification of breeding areas and focus use areas, energy budgets, trophic feeding status, etc. At the very least, all receptor-specific parameters that will be used to derive a risk assessment should be discussed

with EPA prior to completing the Baseline Ecological Risk Assessment (BERA). Any additional information on how a receptor uses a site should be gathered during the next sampling phases. Section 1.3, page 3, Background - EPA's recent document "Role of Background in the CERCLA Cleanup Process" (OSWER 9285.6-07P) recommends that background should not be used to screen out substances from the ecological risk assessment, either because concentrations are below background levels or attributable to background sources. A baseline risk assessment approach should retain and quantitatively assess risk for constituents that exceed risk-based screening concentrations. However, background can be addressed in the risk characterization section. EPA guidance should be consulted for sampling and analysis of background concentration data, and a Work Plan should be submitted and approved before collection of data.

Section 1.3, page 3, Background and Food Web Modeling - A technical memorandum providing the details of the food web model proposal, including model parameterization, should be submitted and approved before it is used in the risk assessment.

Section 1.3, page 3, Overall Process/Ecological Risk - This appears to refine and narrow the scope as a result of the PRE - especially given the statement on Page 6 Section 1.6 that states "following the PRE, more realistic, site-specific assumptions will be used to focus future sampling rounds and evaluations to more accurately characterize risk". Given that the PRE is proposed to be released in the fall of 2003, it is a fair assumption that it will be based solely on historical data and the results of Round 1 sampling that took place in the summer of 2002. Therefore, the PRE can really only address organisms that feed solely on fish tissue (no sediment exposure) and the effects on bioaccumulative compounds on fish. However, some organisms do have sediment exposure as a major route of exposure (e.g. the sandpiper). Since the goal of the PRE (page 5, Section 1.5) is to "identify any potential receptors, pathways, media, and exposure scenarios that may have a potential for risk", the PRE should not be submitted until the nature and extent of contamination has been established for the site. In addition, more data collection (esp. sediment and surface water) may needed to assess risk to amphibians, reptiles, shore birds, diving birds, and the benthic community. If the PRE is used to focus sampling prematurely, relevant exposure pathways may be inappropriately eliminated.

Section 1.3, page 4, Ecological Risk Assessment Process - "To design the 2003 sampling round, the spatial coverage of the Round 1 and historical data will be reviewed with regard to known contaminant sources and representation of receptor habitat and home ranges." It is unclear how home ranges were represented in the proposed 2003 sampling. Comments on the field sampling plan will discuss additional shore bird habitat and amphibian habitat that has not been identified by Respondents in the Work Plan/field sampling plan. Additional sampling will be needed to assess risk for these species.

Section 1.3, page 4, Ecological Risk Assessment Process, 1st paragraph- "In addition, co-located sample analyte concentrations will be reviewed to evaluate the relationship between tissue and

sediment concentrations." The Work Plan should describe the process if no relationship is found.
Section 1.6, page 7, Deliverables - On page 7 it is stated that the BERA will provide "risk management recommendations". This is in Step 8 of the ERA process, but is not a part of the ERA. Recommendations should be presented in a separate section after the conclusion of the risk characterization. This will keep the ERA as an objective evaluation of chemical risk, unaffected by the potential management decisions. Risk management recommendations should be a separate deliverable.

It would be beneficial for the assessment endpoint statement to include the concepts of viability and functioning, especially for those with population and community specific aspects, such as assessment endpoints 1, 2 and 3.

The assessment endpoint statements are too broad in nature. Breaking the assessment endpoints currently proposed into more precise endpoints (such as feeding guild) will not increase the evaluation proposed but will allow more detailed and definitive conclusions at the end of the risk characterization. This should reduce the comments and the work involved in responding to comments overall.

Additionally, by splitting the assessment endpoints there will be a splitting of the risk questions (testable hypotheses). This will also create a situation of better risk communication (which is a critical issue for this site). Again, doing this will not increase the workload it will only break the presentation of the work into defined pieces with defined objects and means of evaluation. The result will be greater work up-front in the presentation of the WP and other documents. But overall, the process should be faster; basically the work has to be done sometime, it is better to do it up-front to make sure everyone understands what is being done and why, rather than fining out after the fact that someone misunderstood and disagrees.

Section 2.0, page 8, Problem Formulation, 2nd paragraph- The assessment endpoints should be modified to include the groundwater and surface water pathways.

Section 2.1.1, pages 8 and 9, Risk Management Goals- The risk management goals are referred to in the referenced text. These goals should be clearly stated so they can be reviewed and commented on if necessary.

Section 2.1.1, Page 9, Assessment Endpoint Level of Protection - This whole paragraph is very confusing and should be clarified. The document often mixes "community" and "population", and what it means in the proposed risk assessment is very ambiguous. Amphibians and reptiles should be protected at the population level. It is still true that some degree of adverse effect is allowed at the population level. However, communities are made up of populations of different species, and it is not allowable to have adverse effects on several populations within a community (if, in fact that is what is meant here by a "community level assessment"). For example, if a population of red-legged frogs is more sensitive than a population of Pacific tree frogs, each population must be assessed (or the most sensitive).

Section 2.1.1, page 10, Assessment Endpoint No. 1 - This assessment endpoint describes protecting aquatic plant communities at the community level. Plants should be protected at the population level.

Section 2.1.1, page 10, Assessment Endpoint No. 2 - Shellfish are called out separately in the SOW. This assessment should be modified to include "survival, growth and reproduction of shellfish populations".
Section 2.1.1, page 11, Assessment Endpoint No. 3 - This assessment endpoint should call out the individual protection level for the threatened and endangered fish, and should then state that all other fish species will be assessed at the population level.

Section 2.1.1, page 11, Assessment Endpoint No. 4 - Amphibians and reptiles should be assessed at the population level.

Section 2.1.1, page 12, Assessment Endpoint No. 5 - This assessment endpoint should call out the individual protection level for the threatened and endangered birds.

Section 2.1.1, page 12, Assessment Endpoint No. 6 - This assessment endpoint should state it is a population level assessment for mammals.

Section 2.1.2, page 13, Habitat and Receptors Outside the ISA - The general risk question presented here relates chemical concentration in media *in the ISA* to adverse effects to *each ecological receptor utilizing habitat within the ISA.* Habitat and receptors, where appropriate, should be considered outside of the ISA if there is a potential for exposure to site-related contamination.

Section 2.1.3, page 14, Criteria for Selection of Measures- In the 3rd bullet, one criterion for selection of measures is whether it "is appropriate scale of the ISA." It should be noted that the scale of the ISA may be larger that the home range of a receptor of interest. Therefore, the scale should be defined in ecological terms, and not just the size of the site. Localized effects should be considered.

Section 2.1.3.2, page 14, Measures of Ecological Effects - This section should clearly define what "individual level", "population level", and "community level" measures mean for the assessment (e.g. comparison to a NOAEL, LOAEL, etc.). In addition, many of the receptors listed under "community level measures" should be moved to "population level measures."

Section 2.1.3.3, page 14, "Appropriate Factors" - It is stated that stressors other than toxicity can modify exposure such as frequency and duration of exposure. It is then stated that "appropriate factors will be evaluated to determine the effect of these factors on the selected assessment endpoints." Please explain.

Section 2.2.1, page 15, Benthic Surveys and Maps - The last paragraph of the reference text should refer the reader to the benthic surveys and maps done using the SPI. This relates good information for where stage 3 benthic organisms have been established.

Figures 2-3a and 2-3b, Habitat Maps- These habitat maps should show the wetland habitat around the railroad corridor (e.g. around North Doane Lake).

Section 2.3.1.2, page 19 - Please distinguish (in the 1st and 2nd paragraphs of the referenced text) what was actually sampled (e.g. target organism). Multiplates positioned above the substrate (the ones deployed by the Respondents were a few feet up) will characterize the filter-feeding, epibenthic community. However, because these plates were not placed in the substrate, this method does not characterize the entire epibenthic community, but only one fraction. It would be beneficial to place some additional artificial substrate in order to characterize the epibenthic (gatherers) and benthic community actually in contact with the sediment.

Page 19, second paragraph - This section states that *Corophium* are one of the organisms that "dominate" the epibenthic community. Results from the SPI analysis indicate that *Corophium* only inhabit the lower section of the river at the lower end of the ISA. This discrepancy should be clarified, and the text should state specifically where *Corophium* are present in the ISA. *Corophium* are very important prey item to juvenile salmonids, and have been shown to be a means of transfer of PCBs and PAHs to these fish. This pathway should be discussed and evaluated for salmonids if *Corophium* are present. In addition, *Corophium* should be sampled for contaminants if they are abundant.

Page 31, second to last paragraph - The text refers to Oregon chub and it should be noted that this species is federally classified as endangered. Respondents should clarify if they believe this chub could be present in the ISA. Also, on page 35 it should be noted that bull trout is federally classified as threatened. Information about the Oregon chub and bull trout can be found on the Fish and Wildlife Service web site at: http://oregonfwo.fws.gov/EndSpp/FactSheets/FishSpecies.dwt.

Section 2.3.3.2, Page 38 - This discussion referring to "diving"ducks is not correct and should be changed or the term should not be used. The terms "diving" and "dabbling" have specific meanings in wildlife biology, and these terms should be used correctly and consistently in the Work Plan. "Diving" and "dabbling" ducks refer to specific groups of ducks distinguished by physical attributes, such as leg placement on the body and degree or type of webbing on their feet, which result in differences in feeding behavior. The importance of making the distinction between the two types has ramifications on risk assessment because these ducks forage differently, therefore, the terms should be described correctly in the context of the risk assessment. Waterfowl in the genus *Anas*, which includes teal, are considered dabbling ducks, meaning they do not dive to gather food. Section 2.3.3.2 should reflect this classification. Teal are primarily herbivores but they will consume small amounts of invertebrates. Also contrary to what is stated in this section of the Work Plan, the wood duck is not a diving duck (or a dabbling duck), but is in a separate tribe (Cairinini) and is considered a perching duck. References to "diving" in this section are not used appropriately and should be changed.

Page 42, 2nd paragraph - It should be noted that nutria were introduced into this area and are considered a nuisance species.

Section 2.4.5, page 46, Habitat Enhancement - There is potential for habitat to be enhanced along the banks of the river due to the City of Portland's Greenway requirements. This should be considered "potential future use" and discussed here.

Section 2.5.1, Page 47 - Wapato is a plant of particular interest to Native Americans and should be considered in the ecological risk assessment.

Section 2.5.1.2, page 48, Epibenthic Macrofauna - The referenced text states that crayfish were selected as a representative species for higher-trophic-level epibenthic macrofauna. Please describe what organisms are to be represented by the sensitivity of the crayfish.

Section 2.5.2 - This section lumps bivalves in with Epibenthic and Infaunal Invertebrates. This is inappropriate. Shellfish should be assessed separately, as they are uniquely sensitive to TBT.

Section 2.5.3.3, page 52 - "…one fish was captured 21 miles from the release site and several fish were not recaptured and may have moved long distances" An equally likely explanation is that the fish were eaten by predators.

Section 2.5.4, page 53, Amphibians - The referenced text states that amphibians will be evaluated at the population level, and implies that representative species will be evaluated for the ISA. This is contradictory to previous statements. Please clarify. It is also stated here that amphibians will be used as a surrogate species to evaluate reptiles. For direct exposure water this may be conservative, but reptiles live longer and may have a greater potential to bioaccumulate contaminants.

Section 2.5.3.4, page 53, Detritivores, 1st full paragraph - The Work Plan should describe how lamprey ammocoetes will be further investigated.

Section 2.5.4, page 53, Amphibians and Reptiles - Amphibians may be a good surrogate for reptiles when assessing soil/sediment, however by assessing amphibians only with water concentrations, reptiles will not be represented.

Section 2.5.4, Page 53 - Are amphibians protective of a turtle that can live much longer and is therefore more susceptible to effects of bioaccumulative chemicals?

Section 2.5.5.1, page 54, Herbivores - It is stated that exposure of the spotted sandpiper will be protective of the dabbling duck. However, it is unclear if exposure units (area use within the ISA and water depth) match-up enough for this to be true.

Section 2.5.5.4, Page 55, - The third sentence should be changed to "The bald eagle is listed as a threatened species under the ESA and is also protected by the Bald Eagle Protection Act, and both the osprey and bald eagle are protected under the Migratory Bird Treaty Act."

Section 2.5.6, page 56, Mammals - It is stated that by assessing the mink, the assessment will be protective of other aquatic or semi-aquatic mammals, such as the river otter. However, it is important that the site use and exposure units used in the assessment to represent the mink corresponds to the probable use by other species.

Section 2.6, Page 57 - If a pathway is designated complete and uncertain, its significance is undetermined. If the reason for this is a lack of toxicological data the pathway will have to be discussed qualitatively. However, if the reason for uncertainty is a lack of site-specific data, then the appropriate information must be gathered and a determination made whether the pathway is major or minor.
Section 2.6.1.2, page 58, Benthic Invertebrate Community - the groundwater pathway may affect other receptors in addition to benthos.

Section 2.6.1.2, page 58, Benthic Invertebrate Community - "The porewater pathway would only potentially affect benthic infauna. For all other receptors, this pathway is considered incomplete." However on page 122 of the Work Plan, "The results of this analysis will be incorporated into the ERA approach for benthic organisms and, if applicable, other receptors." Other receptors such as fish may be at risk and may need to be assessed at some locations.

Section 2.6.1.4, page 60, Amphibians and Reptiles - Data gaps exist, and need to be filled before the risk assessment should be presented. The limited survey conducted was primarily set-up to see if amphibians were using the ISA. However, it was not adequately developed to justify areas for assessment that need to be evaluated in the FSP. This information needs to be presented in this Work Plan, as well as any data gaps that may need to be filled by additional surveys.

Section 2.6.2.1, page 61, Sediment Probing Invertivore - Spotted Sandpiper- It is stated that "ingestion of sediment is considered a complete and major pathway of exposure", but it is also stated that risk will be assessed for this receptor in the PRE. This should not occur until nature and extent of contamination (especially sediment) is completed. Narrowing the scope before nature and extent is completed could result in underestimating risk for this receptor. The appropriate exposure unit should be outlined (home range, the sediment units and areas that will be used in the evaluation). Since sandpiper habitat is defined as "open sediment" (page 82), and beaches up to 8 ft (mean high water), this habitat needs to be assessed for this receptor – data gaps should be evaluated in the Work Plan.

Section 2.6.2.2, Page 62 - Sediment ingestion should be complete and major for mink and should be quantified in the risk assessment. Mink and river otter will consume their prey on beaches or in nearshore habitats. Mink and otter also will forage, burrow, or dig into the sediment and then will consume sediment while grooming their fur. These animals groom frequently because they depend on a highly maintained pelage for survival.

Section 3.4, Page 64 - The last paragraph states that "Uncertainties are associated with QA/QC in all tissue studies." How was this determined?

Section 3.0, pages 63-66 and Table 3-3 - Most of the existing tissue data were not included in Category 1. Please explain. Table 3-3 also provides a list of water and sediment surveys, dates collected, the agency involved, and the usability of the data. The usability is classified as "too old", "acceptable", and "Category 2". Justification of categorization needs to be provided.

Section 4.0, page 67, Risk Drivers - It should be noted that "risk drivers" may change for different areas of the river and that evaluations should not be limited to "harbor-wide risk drivers" – especially if the home range of an ecological receptor is impacted by localized effects. Localized effects must be considered in the COPC selection process. Receptor home ranges and local populations need to be presented so that ecological exposure units can be established for different receptors.
Section 4.0, Page 67 - This section indicates that "knowledge of receptor foraging characteristics" is known or will be obtained. Area-specific information should be gathered on foraging characteristics.

Section 4.0, page 67, Sandpiper Exposure - There will not be enough data to assess the potential exposure to the sandpiper because the nature and extent of sediment contamination and beach sampling is not complete.

Section 4.0, page 67, Use of Food Web Model - It is stated that "the fish food web model will also be used to help identify COPCs and COCs in pathways that contribute to unacceptable risk". More details on objectives, model selection and parameterization needs to be submitted before the PRE.

Section 4.0, page 67, COPC Selection Process - "only a small portion of the analyses will be important harbor-wide "risk drivers," and/or important in risk management decisions" This statement illustrates a misconception that only a "harbor-wide" risk assessment will be conducted. The risk assessment must be site specific as well. Localized areas must also be assessed.

Section 4.2, page 68, Benthic Invertebrates - It is stated that the PRE will use the maximum crayfish and clam tissue effects concentration for each analyte and will be compared to the respective tissue residue effects concentrations for crayfish and clams. With limited clam tissue samples and crayfish from only specific locations, it will not be appropriate to limit COPCs with these samples.

Section 4.2, page 68, Benthic Invertebrates- "Aqueous COPCs will be developed only after surface water data collection is completed." add groundwater to that statement since Aqueous COPCs can only be developed after adequate groundwater investigations have been completed.

Section 4.3, page 69, Screening COPC in PRE- It appears that COPCs will be "screened" or "narrowed" in the PRE on the basis of comparison to dietary based TRVs to daily dose estimates for metabolized COPCs. However, there is no detail here on how that will be done. This may be an important link to the sediment, and shouldn't be done until the nature and extent of contamination has been defined.

Section 4.3, page 69, Fish - Round 1 data alone may not be adequate to eliminate COPCs. For example, the co-located crayfish/sculpin sample locations were selected to represent types of chemicals, but they may not be representative of the highest concentrations.

Section 4.4, page 69, Amphibians and Reptiles- Comparison to Ambient Water Quality Criteria (AWQC) may not be protective of amphibian and reptile populations – the most sensitive life stage should be evaluated.

Section 5.0, page 70, Exposure Point Concentrations (EPCs)- It is important that before EPCs are calculated the appropriate exposure unit has been defined. Different receptors will have different exposure units based on home range. This should be defined for each species and mapped out so that sampling in the FSP supports what needs to be assessed in the ecological risk assessment.

Section 5.0, page 70 and Section 7.0, page 86, Probabilistic Risk Assessment- It is stated that "the usefulness and feasibility of applying probabilistic risk assessment techniques in the BERA will be discussed with EPA and its partners". If probabilistic techniques are used, a Work Plan should be submitted and approved prior to their use.

Section 5.1, page 70, "High End" Exposure Point Concentrations- It is stated here that *the 95% UCL will be used as a "high end" exposure point concentration in the PRE, and a mean concentration will be used in the BERA for those assessed at the population or community level*. It is also stated that the mean EPC will be used to estimate exposure for the *average individual in the population or community*.

The BERA needs to include both central tendency and upper-bound estimates of exposure and risk. For organisms that are immobile (e.g. plants and invertebrates) the exposure point concentration should be the maximum.

We have also have a number of concerns associated with the calculation of the Exposure Point Concentrations (EPC; see section 5.1). Calculation of a 95% upper confidence interval may not provide the most reliable estimate of the EPC depending on what set of samples is used and what specific area is represented. Other methods such as area weighting or nonparametric techniques may better represent some receptors at the site, and provide a more biologically relevant exposure scenario. Some specific issues related to the EPC that should be discussed and agreed upon by EPA prior to completion of the Preliminary Risk Evaluation include 1) identification of the specific area of the ISA selected to represent a receptor; 2) selection of the specific sediment samples used to represent a receptor (prior to receiving analytical chemistry results); and 3) selection of the specific method or methods (such as area weighted averages, 95% confidence intervals, or nonparametric methods) used to calculate the EPC for a specific receptor.

Section 5.0, page 70, Exposure Estimation - More site specific sources (e.g. Oregon Atlas of Wildlife) should also be consulted in addition to the exposure factors handbook in order to determine receptor home ranges, etc.

Section 5.1, page 71, Exposure Point Concentrations - “In the BERA, a mean concentration, a measure of central tendency, will be calculated in addition to the 95% UCL for receptors being assessed at the community or population level. The mean EPC will be used to estimate exposure for the average individual in the population or community.” The last sentence should be removed or clarified.

Section 5.1, equation 2, page 72 - "m = mean of the transformed data." Please clarify if this is a simple log transformation or something else.

Section 5.1, page 72 - "Risks to ecological receptors from exposure to PCBs will be assessed by comparing medium (*sic*) concentration of specific Aroclors to that specific Aroclor toxicity value …" First, do you mean "median" or "mean?" Second, this is unacceptable. For all other contaminants, the proposal is to use the 95% UCL; the same approach should be used for PCBs. Third, this assumes only individual Aroclor assessments; we may also want to consider the effects of total PCBs.

Section 5.2, page 72, Hazard Quotients - The process for selecting TRVs for the risk assessment should be provided and approved prior to the submittal of the PRE. This section should discuss how NOAELs and LOAELs will be determined.

Section 5.3, page 74, Assessment Endpoint 2, Hazard Quotient Approach - Based on statements made earlier in this Work Plan as well as data presented as a part of Attachment C3, it seems likely that sufficient clam tissue could be collected in subsequent rounds in order to assess the effects of bioaccumulative compounds on mollusks. In regards to crayfish, it should be clear what they are representing as “epibenthic macrofauna”. Crayfish were selected due to the potential to bioaccumulate contaminants that may be passed on to higher trophic level organisms, and not for their sensitivity to direct toxicity.

Section 5.3, page 74, Analysis Plan, Assessment Endpoint 2 - “Based on the PRE, the feasibility and utility of collecting more invertebrate tissue samples will be examined for subsequent sampling rounds.” The feasibility and utility should be discussed in the Work Plan and sampling proposed in the field sampling plan.

Section 5.3, page 75, Analysis Plan, Assessment Endpoint 2 - The Work Plan should describe the alternative approach if there is a weak correlation between tissue and sediment chemistry.

Section 5.3, page 75, Analysis Plan, Assessment Endpoint 2 - “If contaminants in porewater are identified as potentially impacting benthic organisms, a separate benthic risk assessment for the groundwater/surface water interface pathway may be completed. Based on chemistry results, dose-response toxicity tests will be completed on benthic organisms to determine whether a predictive site-specific relationship can be developed between the chemistry and toxicity data.” The benthic risk assessment for groundwater/surface water pathway should be part of the baseline risk assessment.

Section 5.3, Page 77 - second paragraph under Assessment Endpoint 3 - Clarify what it is what meant by the statement "For identified bioaccumulative COPCs, chemical concentration in whole body tissues of the representative species for each feeding guild will be analyzed to determine exposure concentrations."

Section 5.3, page 77, Assessment Endpoint 3 - Comparing surface water to AWQC may evaluate direct toxicity, but it does not address the potential for bioaccumulation from surface waters.

Section 5.3, Assessment Endpoint 3, page 77 - The text here describes the Respondents' plan to develop tissue based TRVs for non-metabolized chemicals and dietary TRVs for metabolized chemicals. If there is sufficient literature data available, TRVs should be developed for all pathways (*e.g.*, uptake from water column, dietary exposure, direct exposure to sediment), and the resulting information used in a weight of evidence analysis.

Section 5.3, page 78, Assessment Endpoint 3: Metabolized Contaminant Assessment - If chemicals are metabolized, but are also found in fish tissue, a TRV approach may also be used. For example, historical data (Table 3-6, page 47) indicate that SVOCs have been found in fish tissue collected within the ISA. PAHs have been found in the muscle and whole body tissue of largescale sucker and crayfish.

Section 5.3, page 79, bottom of page - "The results of this stomach screening will not be used for any quantitative purpose in the PRE or BERA." Why not? It seems reasonable to use this information in the food web modeling, for example.

Section 5.3, Page 80 - Assessment Endpoint 4 - The exposure estimates for amphibians need to be quantified, not just qualitatively evaluated. Egg masses are present and exposed to chemicals in the ISA, and data exist for some chemicals that can be used in an amphibian risk assessment. Therefore, the egg mass/chemical pathway should be quantitated and the related equations should be presented in the document.

Section 5.3, page 81, Assessment Endpoints 5 and 6: Local Sources of Information - It is stated that "foraging ranges, daily food consumption rates, and body weights of representative species will be obtained from EPA's Wildlife Exposure Factors Handbook". Local sources of this information should also be consulted to make the assessment as site specific and relevant as possible including Fish and Wildlife Services and local references such as *Atlas of Oregon Wildlif*e, Csuti et al., 1997.

Section 5.3, Page 81, Exposure Dose equation - The placement of the site use factor (SUF) in the equation gives too much emphasis to a value that is extremely subjective, yet is the primary factor that determines risk. The degree to which a receptor uses a site is highly variable and dependent on sex, age, breeding status, habitat and prey availability, and other factors, and cannot be represented by a single number or estimated "fraction" of time a receptor uses a site. The SUF should be eliminated from the equation and the receptor should be considered to use the site 100% of the time unless justification for an alternative site use factor is submitted and approved.

Section 5.3, Page 81, last paragraph - When selecting foraging ranges, daily food consumption rates, body weights, etc., Respondents should rely on literature concerning receptors within or near the ISA, information from experts familiar with receptors in the ISA, reports on similar receptors outside the ISA, data from local publications such as the *Atlas of Oregon Wildlife*, and data from the *Wildlife Exposure Handbook*.

Section 5.3, page 82, Assessment Endpoints 5 and 6, Fraction of Species in Diet - Fraction of invertebrate / fish diet should be presented here for each receptor.

Section 5.3, page 82, Assessment Endpoints 5 and 6: Feeding Habit - All feeding habitat should be clearly defined here for the Hooded Merganser, Spotted Sandpiper, Osprey and Bald Eagle. Locations in the harbor should be clearly defined as well as depth of sediment and beach area evaluations appropriate for each.

Section 5.3, page 82, Analysis Plan Assessment Endpoints 5 and 6 - "Dietary components for each representative species will be obtained from EPA's Wildlife Exposure Factors Handbook (EPA 1993) and/or published scientific literature." Priority should be given to area-specific studies or literature.

Section 5.4, page 83, Data Gap - Define the parameters for the food web model to be sampled in round 2 and include a sampling proposal in the field sampling plan.

Additional *Corbicula* clam samples should be collected and analyzed, especially for PAHs. The Work Plan refers to *Corbicula* being "common" in the ISA, and the infaunal survey found *Corbicula* in a number of locations and demonstrated they could be sampled with enough effort. These samples are important because *Corbicula* have been found in fish stomachs and they are good accumulators of PAHs.

Figure 2-1, Wildlife Food Web Model - Please provide a list of receptors from the LWR that are included in the "epibenthic invertebrates" and "infaunal invertebrates" categories as related to the wildlife in this diagram that are being assessed.

Figures 2-3a and 2-3b, Ecological Habitat - These figures should be expanded for each wildlife receptor (amphibians, reptiles, mink, Spotted Sandpiper, Hooded Merganser, Osprey, Bald Eagle), and should show in-water and surrounding habitat used by each receptor (including uplands if appropriate), and the home range. For some receptors, connectiveness with the uplands is important and will highlight areas of use within the river and beach areas. For in-water organisms, maps from the SPI results that depict the different infaunal benthic stages. Fish maps can also be created that show different habitat used by different fish species in this assessment.

Figure 2-6, Preliminary Ecological Conceptual Site Model - Direct contact/uptake of surface water for amphibians should be shown as complete and major. This pathway should be assessed in the risk assessment. Sediment should also be shown as complete and major for sediment direct contact.

Figure 3-1. This figure should describe how a "hit" was determined. As determined by the study author? By following the DMEF rules? By comparing to the laboratory control?

Figure 5-1, Assessment of the Benthic Community- This figure may need to be revised based on EPA comments to Benthic Approach Technical Memorandum.

Figure 5-2, Fish Receptor Assessment- As show here, toxicity values should be negotiated and agreed upon BEFORE the PRE is conducted.

Figure 5-3, Wildlife Receptor Assessment- The food web model details and parameterization information should be submitted and approved (with all parameter details) before the dose estimates are run and compared to TRVs. This submittal is needed so that data gaps can be collected before a PRE is submitted. In addition, TRVs must be submitted and approved before the PRE.

Table 2-1 - Benthic Macroinvertebrates Found in the Lower Willamette River- Please cite the sources for this table.

Table 2-2 - The references at the bottom of this table do not all appear in the reference list. For example, Busby et al. 1996 or Carl 1936 do not appear in the reference list. Please correct the reference list.

Table 2-7 - Amphibians and Reptiles Possibly Occurring in or Near the ISA, Painted Turtle - A painted turtle was observed in North Doane Lake (just off the RR bridge area) as a part of a field survey to support the Rhone Poulenc site investigation (North Doane Lake Level II Aquatic Ecological Risk Assessment, RPAC – Portland Site, October 15, 2002). This should be added to the table.

Table 3-6, page 45 - Concentrations of Chemicals detected in fish tissue samples collected from within the ISA - Clarify “na” within the “max” column.

Table 3-8, Bioassay Data - The rationale for why certain tests were categorized as Category 2 should be stated.

Table 5-1, DQO Process for the Ecological Risk Evaluation, *Reptiles:* It should be stated that reptiles have been found in the ISA during other field surveys. It is also stated that amphibians will be used as a surrogate for reptiles because they are more sensitive. However, this may not be a conservative assumption for bioaccumulatives. Turtles may be at risk because of potential bioaccumulation of toxics in their tissue.

Table 5-2, page 55, The DQO Process for Fish #7 - “Collect surface sediment samples and surface water samples in each invertebrate exposure area.” Have invertebrate or fish exposure areas been defined? The proposed sampling in the FSP does not adequately represent exposure areas.

Table 5-3, page 59, The DQO Process for Birds #7 - Specify the conditions that would lead to further sampling.

Attachment C1, Table 2, Aquatic Plant and Amphibian/Reptile Reconnaissance Survey- Aster spp. (common wetland asters) are included as found in the LWR. The table should indicate that there are two species of threatened plants (State of Oregon) of interest in the ISA, including White-topped aster (*Aster curtus*) and Wayside aster (*Aster vialis*). See Table 2-8, page 23 in table section.

Attachment C1, Section 1.0, Aquatic Plant and Amphibian/Reptile Reconnaissance Survey- The survey was conducted on June 26-28, a time when many of the egg masses may not be seen. Please discuss the limitations of this survey.

Attachment C1, Aquatic Plant and Amphibian /Reptile Reconnaissance Survey, Section 2.0, page 2. The objective of the survey was to find evidence of amphibians, but it apparently did not include salamanders.
Attachment C1, Section 3.2 and Table 1, Aquatic Plant and Amphibian/Reptile Reconnaissance Survey - It is stated that night sampling was only done for one night because more results were gained by the daytime visual survey. Please explain the limitations of the survey. Also, please give information on the species for the egg masses found.

Attachment C1, Section 4.2, Aquatic Plant and Amphibian/Reptile Reconnaissance Survey - Not all sites were visited at night to listen for night calls, so evidence may be limited for adults (may be unlikely to see them during the day). This survey was adequate to determine if amphibians are likely using the ISA, but not adequate to define exposure areas (on the basis of the survey).

Attachment C1, Section 4.2.4, page 13, Aquatic Plant and Amphibian/Reptile Reconnaissance Survey - Based on this survey, it should be assumed for the purposes of the risk assessment that because the Pacific tree frog was heard in several locations along the Willamette River, that this species is using the mainstem river.

Attachment C2, page 2, Conclusions and Recommendations: Lamprey- The conclusion for lamprey suggests lamprey should be collected in the Spring. However, Sampling has not been proposed in the FSP.

Attachment C2, page 3, Conclusions and Recommendations: Benthos - "At several locations (02R001, 03R001, 05R001, 06R002, 07R003), Corbicula may be abundant and large enough to provide sufficient biomass for tissue chemical analyses with a reasonable effort (e.g., 1-2 days per site)." Minimal clam samples were collected in round 1 and further sampling should be proposed in the field sampling plan.

Attachment C3, page 19, Proposed Process for Assessment of Benthic Risks at the Portland Harbor Superfund Site - This section is incomplete and comments will be provided when the details of the approach are presented in their entirety.

Attachment C3 - The benthic approach needs to be presented in greater detail before it can be assessed. How will the Respondents ensure that sufficient benthic tissue is available for analysis?

Attachment C4, Sections 4.1 and 4.2, Benthic Macroinvertebrate Community Sampling - Please provide the complete list of organisms identified in the epibenthic multiplate samples and infaunal community analysis.

Attachment C4, Section 5.0, Benthic Macroinvertebrate Community Sampling - In order to make comparisons between the epibenthic community and the infaunal community, artificial substrate would have to be used to sample both areas. The current study design does not support the statement "the invertebrate community collected on the multiplate samplers suggests that the epibenthic community in the ISA is more diverse and more abundant than the infaunal invertebrate community." In addition, the epibenthic community sampled here was most likely a filter feeding community (did not have contact with the sediment or food sources that reside there).

Attachment C5, Portland Harbor Round 1 Fish TRV Selection, study Screening -
1st Bullet: There are some good studies using water exposures, and these studies should be included in addition to food exposures.
3rd Bullet: Tests should be included that are in a chemical different form than those present at the site, if appropriate. The selection process (for review) should include all forms.
5th Bullet: Test species should include the most sensitive life stage.

Attachment C5, page 31, Selection Process- "There are situations where safety or uncertainty factors may be considered when determining NOAEL/NOEC and LOAEL/LOEC values." These factors will need to be submitted and approved before the risk assessment.

Attachment C5, Portland Harbor Round 1 Fish TRV Selection, Selection Process- *Toxicity Values*: It is stated that "ultimately, the highest no effect value and the lowest effect value for the most sensitive species will be selected for use in the risk assessment." Ranges of NOAELs should be presented – not just the highest.

Attachment C5, Fish TRV Selection, Literature Search Process, page 29. Behavioral studies need to be included in the list with growth, mortality, and reproduction. Fish survival and reproduction depend on their behavior (Shumway 1999). Behavior is an important sub-lethal effect for a number of contaminants and has been used routinely in mammalian toxicology for years. Only immune system and endocrine disruption effects should be listed as alternative endpoints.

Attachment C5, Fish TRV Selection Study Screening, page 30. The screening steps listed on page 30 and 31 should be eliminated. In lieu of the proposed approach, EPA would like the Respondents to use the following simplified approach. Studies with growth, mortality, reproduction/development, and behavioral effects should be reviewed that have:

1) either a food and/or water exposure to any form of a COC;
2) report both a no-effect and an effect concentration, as there is no way to interpret unbounded effects data, and
3) the effect should be correlated with a single contaminant, although the exposure may be to more than one.

This will result in a limited data set from which protective numbers can be selected. The final selection could be narrowed based on the species and/or contaminant form. However, trying to match species has limited value when the experimental design differences probably outweigh interspecies differences.

Attachments C5 and C8 (TRVs) - These sections do not appear to include all of the comments that have been made on the prior version of the approach. The TRVs need to be submitted and approved before the risk assessment is conducted.

- Literature search process. This process proposes to look only at studies that directly measured effects on growth, survival, or reproduction if they are available. If the Respondents wish to achieve efficiencies in coordinating the CERCLA and NRDA processes, studies with additional endpoints, such as immune system effects, cancer, behavioral abnormalities or other sublethal impacts relevant to a damage assessment should also be collected and reviewed.

- Studies in which the chemical is present in a different form from that in the ISA should be retained to provide additional information unless sufficient data are available for the same form of chemical.

- Studies without negative controls should not be excluded.

- Field studies should not be excluded.

Attachment C6 - Please indicate under what circumstances a food web model will be required rather that using direct BSAFs given that numerous assumptions will be required for any of the models proposed.

Attachment C6, A Review of Aquatic Food Web Models for Potential Application to the Portland Harbor Superfund Site - How a food web model is parameterized is perhaps the most important aspect of how a food web model will perform. This information should be provided (see general comment). This document is recommending the Morrison model. However, details on how the Morrison model might be used "separate out risks to benthic invertebrates associated with water or with hardened surfaces from those associated with sediments" should be clearly presented.

Attachment C8, page 67, Selection Process - "Ultimately, the highest NOAELs and lowest LOAELs derived from qualified source studies will be selected for use in the risk assessment." Depending on the receptors and the studies, the NOAEL will not be limited to the highest. The

range of NOAELs from lowest to highest should be considered for the risk assessment.

Attachment C8, page 6, Portland Harbor Round 1 Bird and Mammal TRV Selection - *Selection of a Surrogate*: It is stated that the selection of a surrogate will be based similarities in metabolic rate. However, differences in species chemical sensitivity must also be considered.

Attachment C9 - I am not sure of the value/relevance of section C 9; the information is seasonally and species specific and therefore may not be appropriate for the assessment endpoint. The assessment endpoint may be multiple species and the diet may be different at different times.

Appendix D - Human Health Risk Assessment Approach

General Comments

(1) Throughout this Appendix, it is implied that the procedures and assumptions presented in the Appendix may be refined or modified once "additional information" is reviewed or "site-specific data" is gathered. The only data gathering that EPA has agreed to is collection of surface water data and additional beach samples. Therefore, only the exposure point concentrations related to these two pathways could possibly change. If the Work Plan is referring to use of historic information, this historic data should be defined and the references cited. If it is referring to collection of new data, the Work Plan must provide a detailed list of what information will be gathered, how it will be gathered, and how it might change the procedures and assumptions in this Appendix.

(2) EPA, its partners and Respondents have had numerous discussions regarding the selection of exposure assumptions/parameters for pathways other than biota consumption. EPA has decided that the parameters agreed to by EPA's risk assessors and EPA's partners should be used in the Work Plan. The changes that should be made to the Work Plan to reflect use of EPA's values are included in the comments on the Tables.

(3) EPA and its partners are still reviewing the technical memorandum submitted on May 9, 2003, by Kennedy/Jenks Consultants on the Respondents' proposed fish consumption rates and the approach that is proposed to develop those rates. Following this review, EPA and its partners will provide comments on the technical memorandum and EPA will provide the biota consumption parameters that should be used for the risk assessment. Also as noted below, any additional approaches that are being considered by the Respondents that may modify any of the biota consumption exposure parameters that will appear in the tables in Appendix D (Tables 16 through 21) or impact the risks estimated for biota consumption in the baseline risk assessment (e.g., use of "the effects of preparation methods") must be clearly and completely detailed and agreed to by EPA before they can be included in the Work Plan or used to assess risk.

(4) As previously discussed in the human health sub-groups, EPA's position is that a well done fish consumption study that provides usable quantitative data, whether for the risk characterization or for comparison with existing studies, would require at least two to three years

to complete and cost several hundred thousand dollars. This is based on our experience with several fish consumption studies the in the Region, including those conducted for several tribes (Columbia River Tribes (CRITFC), Suquamish Tribe, and Tulalip/Squaxin Island Tribes) and Asian Pacific Islanders. We strongly discourage the Respondents from conducting any fish consumption studies or surveys that are less rigorous than these tribal and API studies. EPA will not accept the data from them for use in the risk assessment nor for comparison with existing well done studies.

Specific Comments

Section 1.0, page 1- Delete 1988 and 1989b cites. Replace TEFs from 1989b EPA guidance with TEFs from most recent WHO guidance. In the last paragraph on this page, revise text to include media other than sediment; the definition of the site is not limited to sediment and may also pertain to identified sources of sediment contamination.

Section 1.2, page 2 - The implications of the following statements are unclear: "Whenever possible, site-specific data will be substituted for health-protective default assumptions in order to more accurately estimate potential human health risks associated with the site" and "As additional site-specific data relevant to the HHRA are generated, the initial assumptions presented in the HHRA approach will be revised to incorporate site-specific information". What site-specific data are being referred to? Is this data to be collected in the future or is this referring to the "site-specific" parameters in the Tables 6 through 15? These data should be included in the Work Plan or all such language removed. Also, although the statement is made that the HHRA will initially "incorporate health-protective assumptions in estimating the potential health risk associated with COPCs at the site," the language and several of the exposure parameters in the rest of the Appendix seems to negate the statement.

Section 1.2, page 2 and page 3 - In a recent submittal to EPA, the Respondents have reclassified as Category 1 some existing biota data that were previously designated as Category 2. We assume that this is what the Work Plan is referring to when discussing "historic data of acceptable quality" that might be used in the human health assessment. Before historic data can be used in the risk assessment, EPA and its partners must review these data and agree to their use. It is unclear how these data would be used in conjunction with the biota data collected in 2002 and how relevant they would be to existing site conditions. For example, how would differences in the level of tissue contamination over time be addressed if historic biota contamination levels are greater or less than the data generated from the RI? How would data be combined to calculate exposure point concentrations?

Section 1.2, page 3 - The statement "The results of the baseline HHRA will be used to establish risk-based concentrations...." implies that unacceptable risks will be determined in the baseline HHRA. This statement should be clarified.

Section 2.3, page 4 - The language in this section is not consistent with agreements made between EPA, its partners, and the Respondents regarding selection of COPCs; with later discussions in this Appendix (see Section 2.3.1.1); nor with the most recent EPA guidance.

COPCs for human health should be selected considering not only the 1989 Superfund guidance cited but also the Region 10 guidance, “Developing Risk-Based Cleanup Levels at RCRA Sites in Regions 10”, which in some cases is different than that in the 1989 EPA guidance. For example, the Region 10 guidance does not allow consideration of frequency of detection or a concentration-toxicity screen, and requires use of the Region 9 PRGs with modification. In addition, EPA’s new guidance on background, "Role of Background in the CERCLA Cleanup Program" (April 2002, OSWER 9285.6-07P) does not permit elimination of COPCs from the quantitative risk characterization based on background considerations.

In addition, as explained later in these comments, a COPC screening should not be done for biota, only for sediments and possibly water.

Section 2.3.1, page 5, - Please cite sources of acceptable historic beach data that will be used to identify COPCs. Also, in the second sentence in this section, add the word “beach” before “sediments.”

Section 2.3.1.1, page 5 - Add the following, “for chemicals that exhibit both carcinogenic and noncarcinogenic endpoints, the more conservative screening value will be used for selecting COPCs”.

Regarding residential PRGs for sediments (which will be those designated for soil in the USEPA Region PRG Tables), it would be useful to clarify that for cancer risk as an endpoint, the method for calculating PRGs uses an age-adjusted soil ingestion factor that takes into account the difference in daily soil ingestion rates, body weights, and exposure duration for children from 1 to 6 years old and others from 7 to 31 years old (total exposure over 30 years). For non-cancer endpoints, the more protective method of calculating a PRG is used - evaluating childhood exposures for children (from 1 to 6 years old) using chronic toxicity criteria.

Section 2.3.1.1, page 6 - EPA will soon be releasing a new recommended hierarchy of human health toxicity values for risk assessments on Superfund sites. The following draft hierarchy should be used for development of PRGs and COPC selection and for the risk characterization in the risk assessment. This draft hierarchy is:

Tier 1- IRIS

IRIS values remain the first tier of human health toxicity values for risk assessments on Superfund sites. EPA’s development of IRIS values continues to include the consensus of EPA environmental programs and external peer review. IRIS values are available on the internet on EPA’s website at http://www.epa.gov/iris/.

Tier 2- NCA’s PRTVs

NCEA’s peer-reviewed toxicity values (PRTVs) are developed by the STSC for the EPA Superfund Program, and are now the second tier to be used when a value is not available in IRIS. STSCs reassessment of HEAST toxicity values, as well as development of PRTVs in response to

Regional or Headquarters Superfund program requests, are consistent with Agency practices on toxicity value development, use the most recent scientific literature, and are supported by both internal and external peer review, providing a high level of confidence in the use of these values in the Superfund Program.

Tier 3- Other toxicity values

Other sources of toxicity values may be considered when a toxicity value is needed for a risk assessment on a Superfund site, and a value cannot be found in any of the first two tiers. Three sources of human health toxicity values are mentioned specifically, because the methods and procedures for these sources are similar to those used by EPA for Tier 1 (IRIS) and Tier 2 (STSC's PRTVs), because the agencies developing the non-EPA values obtain peer review on their development of the values, and because these values are made available to the public. As noted in footnote no. 3, a consultation with the NCEA/STSC is recommended regarding some uses of these values from Tier 3 on Superfund sites.

-The Cal EPA toxicity values address both cancer and noncancer effects. Cal EPA toxicity values are available on the Cal EPA internet website at http://www.oehha.ca.gov/risk/chemicalDB//index.asp.

-ATSDR's MRLs address noncancer effects only and are available on the ATSDR internet website at http://www.atsdr.cdc.gov/mrls.html. Note that ATSDR's methodologies for developing MRLs are quite similar to EPA's methodologies for developing Reference Doses (RfDs), although the two types of values do not always agree on a particular contaminant.

-Toxicity values remaining in current versions of HEAST are now part of the Tier 3 of the recommended hierarchy. As ORD/NCEA/STSC reviews toxicity values in HEAST, those values will be removed from HEAST on a periodic basis, perhaps annually.

PRGs for surrogate chemicals with similar structures should be used only if data are not available in any of these 3 tiers of data.

, Section 2.3.1.2 (sediment), page 6, Section 2.3.2.2 (water) page 7, and section 2.3.3.2 (biota), page 8 - EPA and its partners do not agree that frequency of detection is appropriate as a screening criterion now or in the future. Any decision by the Respondents that this criterion is appropriate must be agreed to by EPA.

Section 2.3.2.1, page 7 - We do not agree with the statement that "surface water at the site is not used a source of drinking water. " See comment made on similar statement on page 14, Section 3.3.2.1.

Section 2.3.3, page 8 -See previous comment (Section 1.2) on use of historic data.

Section 2.3.3.1 - The ACGs from the QAPP should not be described as "extremely conservative" nor be used for screening of chemicals in biota tissue. These values were developed to ensure

that appropriate detection limits were used for each analytical method; therefore, ACGs for some chemicals that will be detected in biota may be missing. In addition, the ACGs used for the QAPP may not be as conservative as those that may be developed using the biota ingestion exposure factors that will be recommended by EPA and its partners for the baseline risk assessment.

Therefore, rather than develop new screening level values for biota, EPA recommends that all detected chemicals with toxicity values should be carried through the baseline risk assessment for biota. This was done for the human health risk assessment in the Columbia River Basin Fish Contaminant Survey once it was realized that use of a conservative screening did not greatly impact the list of chemicals to include in the risk assessment.

Section 3.1, page 10 - The method to be used to evaluate potential health effects to pregnant and nursing women who consume biota from the site was not fully discussed during the small group meetings nor a consensus reached. Different approaches can be used, including that recommended in the draft *Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens* (Supplemental Guidance), EPA/630/R-03/003, February 2003. EPA and its partners will be having additional discussions on these approaches and will provide the Respondents with the approach to be used for the risk assessment.

Section 3.1.1, page 11 - The following list (non-bracketed) is our understanding of the exposure scenario(s) that are being recommended by the Respondents for each beach area (river mile estimates are approximate). Please add the scenarios that are bracketed: a transient exposure scenario to the beach at river mile 3.2 west and a recreational scenario to the beach at 9.2-10 east.

River Mile, Side (E or W), Use
3.2 E Transient
3.2 W Recreational [add Transient]
4-5 W Recreational
5.5 E Dock worker
5.8 E Recreational
6.1 E Recreational
6.2-6.8 W Dock worker
6.5 E Recreational
6.9 E Recreational
7 W Transient
7.7 W Dock worker
7.8 E Transient
8.8 lagoon Dock worker
9.1 lagoon Recreational
9.2-10 E Transient [add Recreational]

Section 3.2, page 12 - How are COIs different from COPCs?

Section 3.2 (as well as Section 3.3.2.1, page 15, and Section 3.5.1.2, page 28)- For transients, incidental ingestion of surface water is included, but river water as a primary source of drinking water is dismissed. As discussed in comment to Section 3.3.2.1 (page 15), EPA and its partners consider use of river water as drinking water by transients to be an important pathway that should be evaluated in the risk assessment. Also include this revision to Section 5.3.2 of the main RI/FS Work Plan.

page 13 - first bullet - Add the word "quantitatively " to the last sentence so it reads "Pathways considered complete and significance unknown will be evaluated quantitatively in the HHRA."

Section 3.3, page 14 - Add "and Figure 2" to the end of the first paragraph.

Section 3.3.2.1, page 15 - EPA and its partners do not agree that the "Use of river water as a primary drinking water source for transients is undetermined, but unlikely." It is very likely that river water is used for both drinking and cooking. Dave Stone of Oregon Department of Human Services (ODHS) has observed and photographed a waterfront camp at Willamette Cove (within the ISA) with numerous water containers (not commercial bottled water containers) which were likely being used for drinking and cooking. While the origin of the contained water is unknown, it is likely that is was derived from the River since an alternative source of water was not evident.

We also do not agree with some of the exposure assumptions provided by the Respondents in the tables for this pathway of exposure for transients and have indicated the changes that should be made in our comments on the Tables.

Section 3.3.4, page 17 Native Americans - EPA does not agree that the "results of the CRITFC survey are recommended for use only for evaluation of Native American subsistence fishing populations and not for the Native American general population." The majority of the Native Americans interviewed for this study lived close to the central location where interviews were being conducted. A criticism of this study by the tribes is that it does not truly represent the subsistence fisher who lives off the land and whose ingestion rate would be much higher. A subsistence fisher is likely to get most of his or her protein from fish and game. The fish ingestion rates of 540 grams per day cited by Harris and Harper (Risk Analysis, Vol.17, No. 6, 1997) and 850 to 1000 grams per day cited in Harper, et. al. (Risk Analysis, Vol.22, No. 3, 2002) are more likely representative of a subsistence tribal fisher who gets a majority of their calories and protein from self caught fish.

Non-tribal Consumption Fisher - It should be noted that the "preliminary surveys" being referred to here are very limited and based only upon interviews of 2 or 3 people. And while these few people suggested that carp, catfish and bass are the "most consumed", people eat other species from the ISA and many will eat whatever they are able to catch from the river.

Section 3.3.4.2, page 18 - It is stated in this section that "ingestion and dermal contact exposure factors will be developed in discussion with the EPA and its partners." This discussion has already occurred. EPA and its partners do not agree with many of the exposure

factors for these pathways presented in Tables 13, 14 and 15 and have indicated the changes that should be made to the tables to reflect the consensus position of EPA and its partners.

Section 3.3.4.3, page 19 Anadromous fish - It should be clarified that the O'Neill, et. al. study referred to here dealt only with Puget Sound. Its applicability to Portland Harbor and the ISA are unknown. The last sentence of the first paragraph could be rewritten as "Due to the inability to discriminate between potential exposures to COPCs at the site and other sources of contamination, anadromous species were not selected as target species for the baseline HHRA."

However, it is not appropriate to completely dismiss anadromous fish (salmon and lamprey) and fish with large home ranges (sturgeon) from the human health risk assessment. Salmon may spend months within the river. Lamprey ammocoetes can live many years in constant contact with the sediment before migrating out of the river and adults may spend up to a year absorbing contaminants from sediment and water in the river before being caught for consumption. Residence times and pollutant uptake patterns in white sturgeon are not well known but it is thought that juveniles spend a large portion of time in the river. Not including these migratory species in the risk assessment will likely underestimate potential health risks from consuming biota. This argues for the need for conservative fish consumption rates for resident species. In addition, EPA recommends that the Uncertainty Section of the risk assessment should include a discussion of the uncertainty of not including the risk from consumption of migratory species. This language should make it clear that although it is difficult to determine quantitatively how much of the risk from consumption of these species is a result of contaminants in the Portland Harbor Superfund site, consumption of these three migratory species could add to the risk calculated from that in the Risk Characterization Section of the risk assessment. This is especially true for the tribal fisher for which ingestion rates have been reduced by eliminating migratory (non-resident) species.

In the lamprey reconnaissance survey conducted in 2002, only a small fraction of the fish was examined to determine the species. This survey could not be conclusive about the species caught by Native Americans.

page 21, Resident Fish and Shellfish - The Work Plan states "Tissue data for target species may be used to evaluate potential risks associated with consumption of other fish species with similar food habits". More detail needs to be provided on this. How would such an assumption modify any of the methods used to estimate risk? How would it impact the equations and parameters found in Tables 16 through 21? Does the information provided in Table 10 of the May, 2003, technical memo from Kennedy Jenks pertain to this statement?

Section 3.3.5 - The overlapping scenarios are not explicitly presented. Refer to the conceptual site model (Figure 2) in this section for the overlapping scenarios to be evaluated.

Section 3.4, page 22- The Work Plan states that "In the absence of sufficient data to calculate the 95% UCL, the maximum detected concentration will be used for the RME, and the average concentration for the CT." It is not clear how this applies to the samples taken from the ISA.

For biota, all samples are composites; the EPC will be calculated by location for crayfish, by river mile for bass, and by fishing zone for carp, crappie and bullhead. All of these EPCs will be based on combining the data from one to three composites, therefore this "average" will be used for both the RME and CT. The numbers of composites per EPC will be too low to calculate the 95% UCL on the average nor will there be a maximum value. Beach data are all composite values so again it is unclear what is meant by using the maximum values or the 95% UCL on the mean. Each composite beach sample (or multiple composites for longer beaches) should be used to represent exposures at the beach at which it was collected.

Section 3.4.1 page 22 - A surface water sampling plan has been submitted in the Field Sampling Plan. The agencies will have comments on the water sampling approach. The method for calculating EPCs for surface water should be provided in the final RI/FS Work Plan once the field sampling plan has been resolved.

Section 3.4.2.1 - The last sentence in this section states that EPCs will be estimated for each individual industrial site within dockside worker use areas; however, beach composite samples were not collected with reference to property boundaries. Therefore, a composite beach sample in an industrial area may actually represent exposures at multiple facilities or may represent only a portion of a facility.

Section 3.4.2.2, page 23 - (also see comments on Section 3.4.2.4)- According to Figure 1a, the beach area along the Multnomah Channel is a recreational use area. However, transient camps have been observed in this area. Evaluate exposure to transients in this area in addition to recreational exposure. At river mile 8.2-10 (east side), the beach is being evaluated for a transient scenario. Recreational use was also observed in this area, and should be included in the evaluation.

Section 3.4.2.4 - Have fisher use areas been designated on a figure? We are not clear how the composite beach samples collected in Round 1 correlate to "fisher use areas."

Section 3.4.3. - Before historic data can be used in the risk assessment, EPA must review the data and agree to its use.

Section 3.4.4, page 24 - Elevated detection limits should be discussed qualitatively in the baseline HHRA and also discussed in the uncertainty assessment for the risk characterization for fish ingestion. Furthermore, depending on the number of samples for which elevated detection limits occurred, a limited quantitative analysis could be done to demonstrate whether risks associated with these detection limits are significant relative to chemicals that were detected.

Section 3.4.5.1, page 25, - Delete the sentence "Inorganic arsenic is much more toxic than organic arsenic." Recent data have shown that the methylation of arsenic in the body results in methylated arsenic species that are more toxic than inorganic arsenic.

Any speciated arsenic analyses should be done using a new method developed by EPA and

recently implemented in the EPA Region 10 laboratory. EPA may be requesting that the Respondents supply the Region 10 lab with some of the homogenized tissue from the 2002 biota sampling event so that it can be analyzed using this new method. Unfortunately, good data on inorganic arsenic still does not resolve the issue related to toxicity due to organic species (e.g. DMA resulting from arsenosugars in biota).

Section 3.4.5.2, page 26 - It is unlikely that all 209 congeners will be detected in biota tissue since not all of these congeners were in the Aroclors that were commercially produced.

From this section and Section 4.5 is not quite clear as to how PCB risk will be characterized. Total PCBs should be calculated as: (1) the sum of all Aroclors and (2) the sum of all congeners. Both of these "total PCB" estimates should be used in estimating cancer and non-cancer health effects. For non-cancer health effects, the RfD for Aroclor 1254 should be used with both of these measures of "total PCBs". For cancer, the "total PCBs" concentrations (both Aroclors and congeners) should be adjusted by subtracting the sum of the dioxin-like congeners concentration. The cancer slope factor of 2/(mg/kg-day) for Aroclors should be used with the "adjusted total PCB values". The cancer slope factor for 2,3,7,8,- TCDD (both the older slope factor and the newer slope factor proposed in EPA's draft Dioxin Reassessment) should be used with the toxic equivalency sum of the congeners having TEFs (dioxin-like PCB congeners as well as chlorinated dioxin and furan congeners).

Last sentence of Section 3.4.5.2. - Application of the TEFs to sediment and water is appropriate for ingestion and dermal exposure, but not for bioaccumulation through the food chain as each congener has a different BCF and BSAF.

Section 3.5.1, page 27 - The statement "These values may be refined during the HHRA process as additional site-specific data become available" should be removed unless the Work Plan includes a detailed list of what information will be gathered, how it will be gathered, and how it might change the procedures and assumptions in this Appendix. In general in this section, exposure factors that are not standard default values should be described in the text along with the rationale for these values. The brief rationale provided in the exposure factors tables is not adequate for non-standard assumptions.

page 28 - Remove the statement "if appropriate, beach specific values may be developed to evaluate exposures within a given use area." EPA and its partners have not agreed to beach specific exposure assumptions and there has been no discussion as to how such data would be gathered.

Section 3.5.1.2, page 28 - EPA and its partners do not agree that "it is unlikely that transients use river water as their primary source of drinking water." See previous comment for page 14.

Section 3.5.1.3 - The Work Plan states that marine traffic would make swimming in the lower Willamette River unlikely on a regular basis. While this statement may be true for swimming across the entire stretch of the river, it would not preclude individuals from swimming in areas with eddies, parks, coves and other areas of shelter.

Section 3.5.1.4, page 29 - Because the Work Plan assumes that children do not frequently participate in bank fishing activities, the child fisher will not be evaluated for sediment exposure. ODHS feels this is a faulty assumption. According to ODHS, childhood bank fishing activities have been noted through personal observation, anecdotal evidence and in newspaper articles by the *Oregonian*. ODHS feels that childhood sediment exposure to bank fishing activities should be evaluated, especially since children represent a sensitive endpoint. Although it is possible that the child recreational beach scenario may be protective of exposures that occur while children are fishing with their parents, EPA will be having further discussions with ODHS as to the need for an additional scenario for sediment exposure for the child fisher.

In the second paragraph, last sentence, add the words "for fishers" between "sediment contact" and "are presented."

pages 29, 30 and 31, Section 3.5.1.4 - The Work Plan cites several criteria to be used in selecting fish ingestion rates. EPA does not agree with many of these criteria nor with much of the language in this section. For example, EPA and its partners are opposed to the use of a "fractional intake percentage" to determine ingestion rates for fish caught and consumed in the site. Without specific knowledge from a well conducted fish consumption study, the default assumption should be 100%. The Work Plan also discusses consideration of the effects of cooking loss (on exposure point concentrations, we assume). EPA's guidance (USEPA, 2000a) provides a summary of the effects on organochlorine (e.g., PCBs, DDT, chlordane, dioxins/furans) contaminant levels in fish as a result of fish preparation and cooking. This summary shows that the reductions in chemical concentrations vary considerably among the different studies because of different fish species, contaminants, cooking methods, etc. In these studies most of the percent reductions in chemical concentrations ranged from about 10 to 60%. However, much higher losses were also seen, as was a net gain of one contaminant (PCBs). Overall, these studies support the conclusion that organochlorines can be lost during cooking. But, based on the available information, it is difficult to quantify these losses for use in a risk assessment since the actual losses from cooking depend upon the cooking method (i.e., baking, frying, broiling, etc.), the cooking duration, the temperature during cooking, preparation techniques (i.e., trimmed or untrimmed, with or without skin), the lipid content of the fish, the fish species, and the contaminant levels in the raw fish. Also as discussed in EPA guidance (USEPA, 2000a), several studies indicate that some organo- metal compounds bind to different fish tissues than the tissue which bind organochlorines. Mercury, for example, binds strongly to protein, thereby concentrating in the muscle tissue of fish. Mercury also concentrates in liver and kidney, though at generally lower rates. Thus, preparations such as trimming and gutting, can actually result in a greater average concentration of mercury in the remaining tissues compared with the concentration in the whole fish.

Because the May 9, 2003, technical memo from Kennedy/Jenks contains much more detail than the Work Plan, comments on these criteria and the language in this Work Plan section will be included in comments on the technical memorandum. On February 26, 2003, EPA sent a memo to the Respondents with the exposure factors for biota consumption that EPA and its

partners had agreed to. EPA and its partners will discuss these rates in relation to those recommended by the Respondents in the May 9, 2003, technical memo from Kennedy/Jenks, and then provide to the Respondents the final exposure factors to be used for biota consumption.

Also, for the reasons given above in the General Comments, we strongly discourage the Respondents from conducting any fish consumption studies that are less rigorous than the tribal and API studies cited. EPA will not accept the data from them for use in the risk assessment nor for comparison with existing well done studies.

Section 4.1, page 32 - see comments for page 6 regarding new hierarchy to be used as sources of toxicity values.

If data from structurally similar compounds are to be used to develop toxicity values for chemicals without toxicity values, EPA will need to review the results before the derived toxicity values are used for risk characterization.

Section 4.4, page 35 - Remove “substantiated values” from the first sentence and replace with “recommended”.

The latest WHO TEFs should be used for the risk assessment as they are the “most current, defensible TEFs available”.

Section 4.5 - As previously discussed, this section should be consistent with the following protocol: “Total PCBs” should be calculated as: (1) the sum of all Aroclors and (2) the sum of all congeners. Both of these “total PCB” estimates should be used in estimating cancer and non-cancer health effects. For non-cancer health effects, the RfD for Aroclor 1254 should be used with both of these measures of “total PCBs.” For cancer, the “total PCBs” concentrations (both Aroclors and congeners) should be adjusted by subtracting the sum of the dioxin-like congeners concentration. The cancer slope factor for Aroclors (2/(mg/kg-day) should be used with the “adjusted total PCB values.” The cancer slope factor for 2,3,7,8,- TCDD (both the older slope factor and the newer slope factor proposed in EPA’s draft Dioxin Reassessment) should be used with the toxic equivalency sum of the congeners having TEFs (dioxin-like PCB congeners as well as chlorinated dioxin and furan congeners).

Section 5.1, page 37 - In the last sentence, change “EPA’s acceptable level of 1.0" to “a hazard index of 1, below which remedial action at a Superfund site is usually not warranted ".

Section 5.2, page 38 - Replace “the EPA acceptable risk range of 1×10^{-6} to 1×10^{-4}" with “ a 10^{-4} to 10^{-6} risk range which is the “target range” within which the EPA strives to manage risk as a part of the Superfund program”.

Section 6.0, page 39 - EPA cannot agree to the use of a probability assessment using Monte Carlo simulation unless the following are provided in detail in the Work Plan: methodologies to be used; parameters that will be distributed; and source of these distributions. And as noted

in the Work Plan, the Monte Carlo simulation must also follow EPA guidance, RAGS Volume 3 Part A: Process for Conducting Probabilistic Risk Assessment. The need for additional data collection to address the "uncertainties" should be discussed with EPA before data collection is designed and implemented.

page 40 - Remove "EPA, 1988, Superfund Exposure Assessment Manual" from the references. It is not longer used as guidance.
Figure 1a - Because the Round 2 sampling is moving downstream of where Round 1 samples were collected, additional beach samples should be collected on the west side of the river to evaluate potential residential exposures to beach sediments. Also, the beach area adjacent to Oregon Steel Mills should be sampled to evaluate a dockside worker scenario.

Figures 1a through 1c - The symbols for beach areas are not clearly visible on these figures. Past figures that did not use aerial photographs were more effective in showing the beach areas. The beach areas along the Multnomah Channel and at river mile 3.2-10 (east side) should show overlapping recreational and transient scenarios.

Figure 2 - Second footnote (with small solid dot), add the word"quantitatively" before the word "evaluated." Last footnote, change the word "relevant" to "included."

Table 1 - Remove this table from the Work Plan. As discussed in a previous comment, COPC screening should not be done for biota.

Table 5 - Small mouth bass and crappie were apparently unintentionally omitted from the table as target species. These species were collected in 2002, and will be evaluated in the human health risk assessment.

Table 7 - Change sediment ingestion rate from 100 mg/day to 200 mg/day.
Table 8 - Change water ingestion rate from 100 mL/day for the RME to 2 L/day; change water ingestion rate for the CT from 50 mL/day to 1.4 L/day.

Table 9 - EPA recommends that a default skin surface area of 5,700 cm^2 for adults be used to be consistent with the USEPA guidance in Risk Assessment Guidance for Superfund (RAGS), Part E.

Table 11 - Similar to Table 9 comment, EPA recommends that a default skin surface area for children of 2,800 cm^2 be used to be consistent with RAGS Part E .

Table 13 - Change exposure frequency for the RME from 52 days/year to 156 days/year, and from 26 days/year to 52 days/year for the CT. Change sediment ingestion rate for the RME from 50 mg/day to 100 mg/day.

Table 14 - For the RME, change exposure frequency from 48 days/year to 260 days per year; exposure duration from 30 years to 70 years, and; sediment ingestion rate from 50 mg/day to 100 mg/day. For the CT, change the exposure frequency of 24 days per year to 104 days per

year; and the exposure duration from 9 years to 30 years.

Table 15 - For the RME, change the sediment ingestion rate from 50 mg/day to 100 mg/day.
Tables 14 and 15 - To be consistent with RAGS, Part E, EPA recommends that the skin surface area for adults should be increased to 5,700 cm^2.

Appendix E- Change in Sediment Volume

Page 1 and figures – Describe what the baseline is. Is the baseline the sediment volume when the channel is dredged to -40 Columbia River Datum?

Appendix F- Chemical Sources and Spill Records

Tables F-2a and F-2b, Outfall Locations- The locations of these outfalls should be shown on an appropriate figure.

Table F-1 – Several sites do not have river miles and/or could not be located on a Work Plan figure:

- Schnitzer-Doane Lake (Air Liquide American Corp.)
- Schnitzer near NW Yeon
- Time Oil-Linnton Terminal
- Trumbull Asphalt Plant

Appendix G - Data Sources and QA/QC Reviews

Table 2 or Attachments G-1 through G-3 – Provide the specific reason (of the four factors) why specific data were placed into Category 2 (see comment for Section 4.1.1).